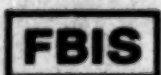


JPRS-TND-84-003

9 February 1984

Worldwide Report

NUCLEAR DEVELOPMENT AND PROLIFERATION



FOREIGN BROADCAST INFORMATION SERVICE

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9 February 1984

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HAWKE FIRM BEHIND NORTHERN TERRITORY URANIUM MINE

Perth THE WEST AUSTRALIAN in English 5 Dec 83 p 4

[Text] Canberra—The Prime Minister, Mr Hawke, yesterday backed increased uranium mining at the Northern Territory's Ranger mine despite simmering opposition to uranium mining in the Labor Party.

He said that the uranium debate was going according to his plan and that he wanted to see Ranger operate to its capacity.

Anti-mining groups within the party later attacked the suggestion as unacceptable and against both party policy and last month's caucus decision on uranium.

And the issue is likely to be a major topic discussion at the ACTU executive meeting which begins in Melbourne today.

A Victorian backbencher, Mr Peter Milton, said yesterday that party policy would not allow the Ranger mine to operate at its capacity.

"No further contracts have been agreed to and the policy doesn't envisage mining out Ranger," Mr Milton said.

"It would be going far beyond what was in the policy and is also contrary to the caucus decision."

In Brisbane, the Queensland parliamentary caucus came out in direct conflict with the Federal Government at a State council meeting on Saturday.

Anti-uranium elements in the party were jubilant after the State council carried a motion requesting the Hawke government to defer any action on mining Roxby Downs till the party's federal conference next year.

This was on the basis that the decisions taken by the parliamentary caucus on November 7 were inconsistent with party policy.

The 26-member ACTU executive is the union movement's highest regularly meeting body, which interprets policy between congresses.

Public attention will focus on uranium after comments by ACTU president Cliff Dolan in Geneva last week.

Mr Dolan said that he would like to see an ACTU campaign of bans against the Federal ALP-caucus decision to give Roxby Downs the go-ahead.

CSO: 5100/4353

ACTU PLEDGES TO STOP URANIUM MINING AT ROXBY DOWNS

Canberra THE AUSTRALIAN in English 6 Dec 83 pp 1, 2

[Text]

THE ACTU would try to stop uranium mining at Roxby Downs, its president, Mr Dolan, said yesterday.

The ACTU would also discourage people from working in the uranium industry.

Although members of the affiliated unions had worked for several years in the uranium industry, Roxby Downs was a new mine and thus should be treated as an "independent case".

"I do not know if we can stop the mining of uranium at Roxby Downs and I am not prepared to make a prediction, but we certainly will be attempting to do so," Mr Dolan said.

A meeting would be held as soon as possible among unions with members employed in the uranium industry and in providing goods and services to it.

The unions would make a fresh attempt to implement their policy of opposition to the mining and export of uranium.

"We have two main options — firstly, attempt to convince people that they should not work in this industry; secondly, attempt to stop supplies to the industry and make it impossible to do open mining," he said.

The uranium controversy is likely to be discussed tomorrow by the ACTU executive meeting in Melbourne. But a motion on the issue could be brought on today.

Mr Dolan wants to call a special conference of unions involved in the industry. The purpose of the conference is not entirely clear because a number of unions have broken the ACTU's anti-uranium policy.

The unions, including the Miscellaneous Workers Union, the Australian Workers Union, the Seamen's Union, the Transport Workers Union, and the Waterside Workers Federation, have vowed to continue working in the industry.

They are reluctant to surrender their membership coverage for fear of other unions taking their membership and the power inherent in the industry.

Some ACTU executive members, particularly of the right wing, believe a special unions conference would be a waste of time and money.

But Mr Dolan will get support from most State trades hall council representatives who have to maintain an official anti-uranium stand.

The ACTU executive meeting, which will centre on the effectiveness of the prices-and-incomes accord, ends on Friday.

After a two-hour meeting yesterday, the executive retired to the Moonee Valley racecourse for the annual Christmas function.

Drinks were enjoyed by about 200 trade union officials, employers and government appointees overlooking the remains of the building trades Christmas party, which was held on the race course.

Mr Dolan summed up the evening when he referred to the gloom surrounding last year's function — a Liberal federal government and sackings hitting most industries.

"Things are not as gloomy as they were last year," he said. "This is not a time for being terribly serious in the festive season."

LOCAL INVOLVEMENT IN PRC NUCLEAR POWER PLANT ADVANCES

Meeting Future Hong Kong Needs

Hong Kong SOUTH CHINA MORNING POST in English 26 Nov 83 p 7

[Excerpt]

The chairman of China Light and Power Company, Lord Kadoorie, yesterday defended Hongkong's involvement in the Daya Bay nuclear power project — which critics say is unnecessary.

However, Lord Kadoorie said that the nuclear option would only postpone for two to three years the need to build another conventional power station to meet Hongkong's future energy needs.

The Financial Secretary, Sir John Brearley, disclosed that China had specifically asked for the involvement of China Light in the nuclear project in recognition of its competent management.

Sir John described the power company as having an "exceptionally able and competent management" under the chairmanship of Lord Kadoorie.

"It is a great tribute to this competence that the Chinese authorities have made it quite clear to the Hongkong Government that in the Guangdong nuclear power station, 25 per cent of the equity of which will be held by Hongkong interests, the Chinese wish Lord Kadoorie and China Light and Power to take the guiding part," he said.

"This is a great tribute and is certainly one to which the Hongkong Government is happy to subscribe."

Lord Kadoorie and Sir John were speaking at the chimney topping-off ceremony of the "B" station of China Light's power plant in

Tap Shek Kok, Castle Peak.

The 250-metre high chimney, the tallest concrete structure in Hongkong, is "a monument of our confidence in the future," said Lord Kadoorie.

When completed, the "B" station will house four 660 mw coal-fired generating units, to be commissioned between 1986 and 1990.

This is in addition to four 350 mw dual coal/oil-fired and four 60 mw gas turbine generating units in the plant's "A" station, which will be fully operational by the end of next year.

However, not even the completion of the two stations and power supplied eventually by the Daya Bay nuclear station is going to satisfy Hongkong's future energy needs, Lord Kadoorie said.

"What we must remember is that participation in the nuclear project is not a once-and-for-all answer to our future energy needs.

"Indeed, it may come as a shock to some people to realise that the nuclear option will only postpone the need to embark on a third conventional power station in Hongkong for two to three years and planning for this station will have to start before the end of this decade.

"The need for this third station does not appeal to me since it will reflect the continuing progress of Hongkong — a progress in which I firmly believe."

Daya Bay Approval

Hong Kong SOUTH CHINA MORNING POST in English 8 Dec 83 pp 1, 19

[Article by Frank Choi]

[Excerpts] A Sino-British agreement on the \$36 billion Daya Bay nuclear power project was signed yesterday.

The agreement expressed both the British and Chinese Governments' full support both financially and technically for the project.

It also laid the foundation for the formation of a joint venture company between the Hongkong and Guangdong nuclear investment companies.

And the proposed joint venture company will be responsible for future developments and arrangements concerning the project upon its formation.

This was disclosed by the British Deputy Secretary of Industry, Mr Gordon Manzie, who arrived from Peking yesterday for an overnight stay.

The Manzie delegation had just completed two days of talks with Chinese officials from the Ministry of Water Resources and Electric Power, including its Vice-Minister, Mr Peng Shilu, who is the project director of the Daya Bay plant.

The discussion covered investment and loans for the project, the selling of electricity and the supply of equipment, he said.

"The agreement also sets a framework within which negotiations between the Hongkong Nuclear Investment Co Ltd (HKNIC) and the Guangdong Nuclear Investment Co Ltd are now proceeding in the formation of a joint venture company," he said.

Mr Manzie stressed the agreement aimed to provide a framework for the project and the formation of the joint venture company.

"The actual discussion of that (the formation of the proposed company) will take place between the two nuclear investment companies.

"The British Government would play no part in such discussion because it is a matter for the Hongkong and Guangdong companies," he said.

Earlier, the Hongkong Government announced that Hongkong companies would join in the venture to build the US\$4.1 billion (about HK\$36 billion) power plant at Daya Bay.

The Secretary for Economic Services, Mr Piers Jacobs, said the new Hongkong Nuclear Investment Co would buy 70 per cent of the electricity produced by the 1,800-megawatt plant, expected to be completed in 1991.

Mr Jacobs said 90 per cent of the cost would be provided by loans, with the remainder coming from China and the Hongkong company.

Hong Kong-Guandong Talks

Hong Kong SOUTH CHINA MORNING POST in English 11 Dec 83 p 1

[Article by Albert Chan]

[Text]

The Daya Bay nuclear plant may be completed two years ahead of its original schedule.

The Secretary for Economic Services, Mr Piers Jacobs, yesterday named the target date as 1989 as against last month's estimate of 1991.

According to Mr Jacobs, the pace of discussions between China Light and Power and the Guandong Power Company "is likely to accelerate."

He met the press after holding a debut meeting between top officials from the Hongkong Government and the Chinese authorities in Shumchun.

And he said he was "hopeful" that the Hongkong Electric Company would join the project.

Heading the Chinese delegation was Chinese nuclear expert Mr Peng Shilu, the Vice-Minister at the Ministry of Water Resources and Electric Power who has just returned from Peking reporting to Chinese leaders on the project.

Referring to the new construction date, Mr Jacobs said he hoped it would be met. "Time is money, as Vice-Minister Peng explained to us," he said.

But Mr Peng denied that China had set any deadline for its Hongkong partner. "It is quite meaningless to do so. We must work by mutual discussion."

However, he repeated that the earlier the project was completed, the more money would be saved.

According to his estimation, a one-day delay would cost US\$1 million (about HK\$7.8 million), caused by inflation in engineers' expenditure and interest on loans.

"We dare not sign huge contracts like those involved in the plant unless the joint venture company has been formed," Mr Peng said.

It was also disclosed that China and Hongkong would join forces in monitoring levels of radioactivity.

"We agreed that a liaison should be established between the Royal Observatory and the relevant departments on the Chinese side responsible for the establishment of radiation monitoring facilities," Mr Jacobs said.

The hint of such a liaison was first made late last month when the Director of the Royal Observatory announced plans to set up three weather stations in Hongkong to monitor background radioactivity.

The Hongkong team, led by Mr Jacobs, was made up of Mr William Stones, CLP's deputy general manager; Mr K.L. Poon, CLP's corporate planning manager; Mr Rich-

ard Margolis, deputy political adviser; Mr Y.P. Cheng, Government chief interpreter; Mr K.Y. Yeung, Deputy Secretary for Economic Services; Mr John Wilson, Principal Assistant Secretary for Economic Services; and Mr Paul Brown, Government Secretariat press officer.

The group was to have held the meeting and site visit on November 19, but it was postponed because some delegates had not completed the necessary travel documentation.

The main aim of the trip was to re-establish contact with Chinese officials involved in the nuclear plant and to make the site visit, now due to take place this morning.

Mr Jacobs also took the opportunity to present Mr Peng with the memorandum and articles of the Hongkong NIC, which was incorporated in Hongkong on Monday.

"In Hongkong, the first tangible bureaucratic step has been taken in that we have now formed the Hongkong partner in the joint venture company," he told Mr Peng as he handed over the memorandum and articles during the first half of the meeting.

"There is a great deal of interest in this company (NIC) and I would like to see

Hongkong institutions one day invest in it.

"I do believe Hongkong as a whole should take an interest in this project which is really a benefit to all of us," Mr Jacobs continued.

FOE Objections

Hong Kong SOUTH CHINA MORNING POST in English 12 Dec 83 p 22

[Article by Vaudine England]

[Excerpts] The need for the nuclear power plant being built in Daya Bay with Hongkong financial support has been questioned by the Friends of the Earth, following the publication on Saturday of an American study on the nuclear power industry.

Yesterday, Ms Linda Siddall, speaking for the FOE, said that too little economic analysis had been done on the Daya Bay plant, and that important questions remained as to whether the plant's power was needed at all.

Another aspect of the economic bind imposed by the nuclear industry, she said, was the position of dependency forced on the buying country (in this case both China and Hongkong) with regard to both loan capital and nuclear technology.

"The estimates for Hongkong's future electricity needs are based on a continuing explosive boomtime growth in demand, but indications are that there is already a downturn in demand," Ms Siddall said.

"We query the assessment that the power plant is necessary in Hongkong, and that it is fundamentally sustainable.

"There are no estimates of the benefits of energy conservation in Hongkong, unlike in more enlightened countries where governments accept that vast amounts of energy can be saved through conservation and solar power."

She questioned China's need for the Daya Bay plant, when 70 per cent of the power it would produce would be sold to Hongkong.

Last week the Secretary for Economic Services, Mr Piers Jacobs, was reported as saying that if energy demand dropped off conventional plants could always be closed.

"Is it worth the cost? Surely we would be better to get our sums right in the first place," she said.

"For 30 per cent of the power output, China is subjecting herself to economic imperialism and so are we, because where is all this money coming from?"

Not only did China have to raise the loan capital for the plant from outside, it also had to import the technology for it.

She added: "A story in the SCM Post earlier in the week about an accident at a plant in the Gobi Desert, put down to inexperience, has not lessened our worries.

"We are also concerned that the schedule for the Daya Bay plant is already being speeded up.

"We wonder what effect this will have on safety needs."

Ms Siddall said that if corners were being cut already, serious questions would have to be raised about the plant's viability.

CSO: 5100/7513

SCHEME TO MONITOR DAYA BAY PLANT'S RADIOACTIVITY DISCUSSED

Observatory's Proposal

Hong Kong SOUTH CHINA MORNING POST in English 30 Nov 83 p 20

[Text]

The Royal Observatory has proposed that three weather stations near the Chinese border should begin monitoring background radioactivity.

This is with the intent of "setting the hearts and minds of people at ease" about radioactivity levels when the Daya Bay nuclear power plant is operational.

And the findings from these stations will be available to the public for inspection, the director of the Royal Observatory, Mr John Peacock, said yesterday.

The three sample-collecting stations proposed are at Tsim Bei Tsui, Shataukok and Yuen Ng Fan, near High Island — all on the northern and eastern periphery of Hongkong, Mr Peacock said.

About \$2 million would have to be spent on essential equipment for the stations, he said.

A further \$500,000-odd would be required in the first year for staff for the project, beginning with the recruitment of one expert.

The first phase of the project would concentrate on measuring atmospheric radioactivity.

If there are no delays, the Royal Observatory hopes to get the necessary funds next year and to see monitoring work begin in 1985.

A second phase would involve the measurement of radioactivity other than in the atmosphere.

This would include radioactivity in sea water, part-

ly to observe the effects, if any, of discharges from the nuclear power plant later.

The entire proposal is now being studied by the Economic Services Branch, Mr Peacock said.

A go-ahead would provide the Government with equipment to monitor any leaks from the Daya Bay station in the northeast.

But with a properly constructed and managed operation, there should be no problem with leaks, Mr Peacock stressed, when asked about the risks of having a nuclear power plant about 40 km away from the Hongkong border.

"It seems to us prudent to measure background levels generally so that once the plant is operating we can give the people assurances based on scientific data that there is no increase in radioactivity," he said.

It is normal practice to monitor radioactivity around a nuclear power plant to determine background levels prior to its setting up, he said.

This is so that any fluctuations in radioactivity after the plant becomes operational can be clarified to see if they are normal variations or something to be concerned about, he said.

"We don't want people to start getting particularly concerned when the variability is normal. There is always radioactivity in the atmosphere, both natural and man-made from atomic tests.

"Our proposal is for a phased programme. We think now is the opportune time to start a move in this direction.

"If the Daya Bay station becomes operational in 1991, as has been announced, it is probable that radioactive material will be taken to the site two years before that.

"We want an adequate lead time to establish the background levels before any radioactive material is transported to the site," Mr Peacock said.

The Royal Observatory is not in any rush to start the project, but feels that now is a wise and sensible time to do so, he said.

The Tsim Bei Tsui and Yuen Ng Fan stations are now used to measure seismological movements while an automatic rainfall recording station is being set up at Shaukok.

These three weather stations were chosen for the monitoring work partly because they will already be operating and funds will be saved by not having to build new ones.

"Everything is still under discussion," Mr Peacock stressed.

The radioactivity monitoring by the three proposed weather stations will be dif-

ferent from that currently carried out by the Royal Observatory at King's Park.

The Royal Observatory will be looking more closely at the various radionuclides other than those arising from atomic weapons tests, which is basically what is done at King's Park.

The King's Park operation was, in fact, started in 1961 because of the atomic tests being carried out worldwide.

It is presently the Royal Observatory's only station monitoring radioactivity.

Meanwhile, about \$145,000 worth of new equipment being installed at King's Park is expected to become operational in January.

When the order for the new equipment was placed, account was taken of the possible extension of its functions.

"We would anticipate that the Chinese will be setting up stations to monitor radioactivity in the vicinity of the proposed station and we anticipate that liaison will be established with these," Mr Peacock said.

He noted that China has already expressed its intention that the Daya Bay plant will be built to the highest international standards.

Nuclear Group's Support

Hong Kong SOUTH CHINA MORNING POST in English 1 Dec 83 p 18

[Text]

The Joint Organisation for Concern on Nuclear Energy yesterday reacted favourably towards the Royal Observatory's proposal that three weather stations near the border should begin monitoring background radioactivity.

A spokeswoman, Miss Trini Leung, welcomed the remark by the Director of the Royal Observatory, Mr John Peacock, that the findings from these stations would be available to the public for inspection.

"We are pleased with the proposal and we hope it will become a reality," she said.

Mr Peacock, she said, was more "realistic" than those Government officials who insisted that the Daya Bay nuclear plant would not pose potential risks to Hongkong.

Miss Leung appealed to the Government to announce the potential risks involved in the operation of the plant and what precautions or safety measures should be taken.

Miss Leung said the feasibility study done by American consultants two years ago, which also touched on environment impacts, should be released to the public.

The consultants were jointly employed by China Light and Power and the Chinese Government, she said.

A copy of the report was later submitted to the Hongkong Government, Miss Leung said.

"We have asked in vain for details of the report," she said.

Meanwhile, the organisation is still awaiting reply from Chinese nuclear experts on when its delegation can meet them to discuss the safety aspects of the nuclear plant.

THREE YEARS OF JASLOVSKE BOHUNICE NUCLEAR PLANT VIEWED

Prague RUDE PRAVO in Czech 12 Dec 83 p 3

[Article by Engineer Milan Rusnak, CSc, federal first deputy minister of fuels and power: "Favorable Results of the Czechoslovak Power Industry During the First Three Years of the 7th Five-Year Plan. Conditions for More Intensive Development"]

[Text] Nearly three years of the 7th Five-Year Plan are behind us, and this entitles the power industry to review the work performed, to draw a balance of the attained results, and to analyze the problems and shortcomings that had to be resolved. On the basis of the results achieved in this area it is possible to specify the further course of action in fulfilling the objectives of the party's economic policy. The results confirm that it is becoming increasingly difficult to supply the sources of fuel and power necessary to ensure the planned dynamic development of the national economy. Primarily the conditions are worsening under which we are supplying them.

Beginning with last year, the Czechoslovak economy has been forced to cope with a pronounced curtailment of the import of refined fuels, and with a stagnation in the consumption of primary sources of energy. It has been necessary to respond to this by changing the structure of the fuel and power balance, and by accelerating the creation of conditions for generating electric power from available fuels, particularly from steam coal mined in the basins of the Krusne Hory [Erz Gebirge] foothills. This is why we are continuing to place emphasis on the good working condition, operational reliability, and the necessary economic efficiency of the power plants burning such fuel.

The outlined development, together with the extension of the time limits for the commissioning of new nuclear generating units, had a negative effect on the realization of the program for the innovation and modernization of the power industry's production base. It was not possible to create the planned reserves necessary for the extended shutdowns of the individual steam power plants. Thus more complex conditions arose for the realization of the adopted objectives whose purpose is to make the burning of lower-grade fuels economical, to alleviate the ecological problems, and to streamline the process of energy transformation through the cogeneration of power and heat.

Steam Power Plants Decisive

The past period proceeded in the spirit of the conceptual changes in the structure of the power industry's productive fixed capital. With the construction

of the 500-MW generating unit at the Melnik power plant, and of the five 210-MW generating units in the second stage of the Prunerov power plant, the period of building conventional steam power plants has practically ended. For the time being, however, they are of decisive importance in the statewide power balance. They represent 80 percent of the electric power system's installed generating capacity, and their share of the planned output of electric power this year is 86 percent. Moreover, they are compensating for the deficit in the output of the hydroelectric power plants due to the shortage of water, and also for the slippages in the completion of the nuclear generating capacities at the Jaslovske Bohunice and Dukovany nuclear power plants.

After initial problems, the five years of operation of our first commercial nuclear power plant confirmed that it is a very reliable element within the electric power system. Although it represents only 4.5 percent of the statewide balance of installed generating capacity, this year its share of the planned output of electricity is roughly 8 percent. The initiative of its workers has made it possible to shorten the general overhaul of its equipment, and therefore we expect a high overfulfillment of the plan. Up to now the power-industry workers of the V-1 nuclear power plant have supplied for the national economy more than 23 billion kilowatt-hours of electricity into the power grid.

The hydroelectric and pumped-storage power plants also help to supply the daily load diagram. Because of the unfavorable conditions this year, however, they cannot be used to their customary extent, only for peak shaving, due to the low water level in the reservoirs. As sources of electricity, also industrial power plants are by no means negligible. They account for nearly 14 percent of the total installed generating capacity and supply more than 13 percent of our total power consumption.

The power industry is fulfilling its planned tasks this year satisfactorily. We expect the steam power plants to exceed their planned output by roughly 560 million kilowatt-hours; the hydroelectric power plants will end the year with a shortfall of about 200 million kWh; and the V-1 nuclear power plant will exceed the plan by about 400 million kWh.

Lower Specific Fuel Consumption

General overhauls and reconstructions play an important role in the industrial technology base of the power industry. Their entire program is closely linked with the balance of generating capacities and, in principle, is subordinated to it. Therefore the realization of this program within the specified time limits and in suitable quality require efficient technical and organizational work, and also purposeful cooperation between power-industry workers and the supplier organizations, mainly the engineering ministries. Here socialist competition plays a unique role and favorably influences the entire course of work. The complexity of this work is illustrated by the fact that this year we are repairing 87 boilers totaling 12,290 MW, and 65 turbogenerators with a combined generating capacity of 5,211 MW.

Improvement of the economic efficiency of power generation is an inseparable part of general overhauls and reconstructions. The objective is to reduce the

specific fuel consumption by 14 grams of standard fuel equivalent per kWh of output by the end of the current five-year period. In view of the worsening quality of the coal, this is a demanding task. We are gradually implementing a set of technical and organizational measures that include the innovation of the paths of flow through the turbines, automatic regulation and optimization of the combustion processes, intensification of the operation of the cooling towers and condensers, and the redesigning of other power-plant equipment. At the same time we are continuing to modify the technological equipment so as to exclude the effect of the declining calorific value of the fuel, and of the changes and fluctuations in the properties of the fuel.

Unique Role of Distribution Network

The power networks form a complex and mutually integrated system that decisively influences the reliability and quality of power supply. The networks have more than four million suspension points and a quarter million kilometers of lines, supplemented by roughly 51,000 transformer stations. A 400-kV transmission system has been built, one of the best systems of this voltage level within CEMA. Its frequency of breakdowns has been significantly reduced under the 7th Five-Year Plan, and also the reliability of the large transformers has clearly improved. Certain problems are beginning to appear in the 220-kV system that is nearing the end of its service life. Much of its equipment is no longer being produced, and the maintenance and reconstruction of the equipment are complicated. The problems are being caused especially by certain types of circuit breakers, transformers, and voltage and current transformers that must be imported. However, the latest analyses indicate that we will have to keep the 220-kV system in operation much longer than we anticipated. There are no basic problems with the operation of the 110-kV system that functions as a VHV distribution network.

There are serious difficulties with the HV and LV distribution networks. They show their considerable age--they are 40 to 50 years old--and their current load is heavy. They influence unfavorably the reliability and quality of electricity supply especially in areas where the voltage is not standardized, which includes also the capital city of Prague. For the time being we are unable to speed up the renewal of these distribution networks, although we are striving to resolve the situation despite our limited investment resources. We are proceeding on the basis of a detailed analysis of the mechanical and electrical states of the networks; we are using computer technology and are streamlining construction and installations work; together with other technical measures, this is helping us reduce losses. In particular we want to replace the iron conductors and transformers with equipment that has oriented sheets; to scrap the networks with nonstandardized voltage; and to introduce cumulative remote control, work with live wires, and other measures.

New Tasks

The electric power system is an intricate complex of technical and technological equipment whose individual elements are closely interconnected and mutually influence one another. Therefore we are devoting considerable attention to ensuring the electric power system's reliable operation, especially under demanding winter conditions. The decisive task in preparing for this winter has been

to take advantage of the favorable results in coal mining and of the good weather and to build up the largest stocks of fuel in the power industry's history. Thanks to exceptional measures, and to the initiative of the workers at the mining, transportation and power-industry organizations, we have succeeded in fulfilling this task, which also ensures for us a good start into the coming year.

A no less important task is the efficient and economical use of fuel and power resources, a high degree of readiness of the power-generating, transmission and distribution installations, and the reliable functioning of the load dispatcher's control equipment. The actual state of preparedness for winter was verified through comprehensive physical audits that checked the following: the fixed assets; the reduction of fuel and power consumption; operating, technological and load-dispatching discipline; and industrial safety, the prevention of accidents, and the possible limitation of their consequences.

Winter also marks the commencement of the five-year plan's fourth year, during which there should be a further rise in the rate of economic growth and in the efficiency of production. Therefore it is necessary to intensify state, planning and labor discipline, and to reinforce the positive features of the national economy's development.

The key to solving the fuel and power problems lies in the reliable operation of the first nuclear generating units of the V-2 nuclear power plant in Jaslovské Bohunice, and of the Dukovany nuclear power plant. This will guarantee an improvement of the balance of generating capacities, the more even operation of the entire electric power system, and also lower fuel consumption. Therefore we are concentrating the primary attention of the power-industry workers and of all the other participating ministries on the completion, checking, partial testing and power startup of these nuclear generating units, and on phasing them into the power system.

At the same time we are placing exceptional emphasis on the active participation of the power industry's workers in reducing the energy intensity of the national economy, in the highest possible utilization of fuels not included in the fuel and power balance, in the purposeful reconstruction of the stock of boilers, in general overhauls and innovative repairs, and in reducing transmission and distribution losses at the lowest possible investment costs. Here we want to implement State Target Program 02, "Rationalization of the Consumption and Utilization of Fuels and Power." In the area of district heating we regard as decisive a reduction of the consumption of liquid fuels and high-grade coal, while maintaining the supply of heat specified in the plan and improving the state of the heat-distribution installations. We are concentrating also on cogeneration of electricity and heat, and on elaborating the concept of building nuclear district-heating plants.

Thus to date the course of the 7th Five-Year Plan in the electric power industry has not been simple. But even under the objectively worsening conditions, the workers of the industry have fulfilled their basic mission: to continuously supply the economy and the population with electricity and heat. They have achieved many favorable results and are determined to do everything so that the power industry may contribute toward the economy's already begun intensification, and the successful fulfillment of the 7th Five-Year Plan's remaining tasks.

BRAZILIAN PRESS REPORTS ON ARGENTINE ENRICHMENT PROGRAM

Atomic Bomb Objective

Sao Paulo O ESTADO DE SAO PAULO in Portuguese 4 Dec 83 p 12

[Article by special correspondent Flavio Tavares]

[Text] Buenos Aires—The Argentine nuclear plan took the military course openly in the quest for the atomic bomb. The race is hurried, almost desperate. Basically, it is the trap that the military government leaves set for the president-elect.

If he tries to disarm it to prevent the madness, Raul Alfonsin runs the risk of also interrupting the part of the nuclear program intended for peaceful purposes, which is basic in an Argentina that lacks electricity and that needs to rearrange and expand its industrial park, practically paralyzed since the establishment of the military dictatorship in March 1976.

Alfonsin says that he will directly control the nuclear program "because of the need to strictly limit all of its development to the peaceful use of atomic energy." But the admonition of the president-elect itself reveals his deep concern about a matter which the military dictatorial government dealt with in a secret and clandestine manner during the past 7 years. Two weeks ago everything became public when the chairman of the Atomic Energy Commission, Admiral Carlos Castro Madero, officially revealed that Argentina is in a position to produce enriched uranium (and thus the nuclear bomb).

It is impossible to estimate the exact time but the admiral himself admitted that, theoretically, Argentina could have the bomb "3 years from now." He stressed that the program has not been diverted from its peaceful aims and that the Pilcaniyeu plant will produce 20 percent enriched uranium. In order to produce fission (or the uncontrolled chain rupture of the nucleus, the principle of the bomb) 97 percent enrichment is necessary. However, attention is called to the fact that the official announcement of the attainment of uranium enrichment technology was made unexpectedly in Buenos Aires 3 days after the death of nuclear physicist Jorge Sabato, the biggest critic of the military expansionism of the Argentine atomic program.

The cancer which killed the most important Argentine nuclear physicist last month has much to do (in its causes) with the vexation that Sabat encountered years ago in the Atomic Energy Commission, when he criticized the growing militarization of the research and development programs. Called a "leftist and subversive," he had to leave the country and went to Iran during the time of Shah Reza Pahlevi (before Khomeyni) to coordinate the Iranian nuclear program.

Many scientists believe that with Sabato alive, it would have been unthinkable for the Atomic Energy Commission to have announced "with impunity" that the uranium enrichment technology is aimed at "peaceful" purposes. Sabato knew the Argentine nuclear plans and steps in detail, millimeter by millimeter. Only months of suffering and, afterwards, death prevented him from denouncing the "madness of the atomic bomb."

Soviet Help

The help of the Soviet Union during the last 18 months enabled Argentina to hasten achievement of the complete uranium enrichment technology. In November 1981, the Argentine military dictatorship and the Kremlin signed nuclear technology assistance agreements in addition to the sale to Argentina of a ton to Soviet heavy water and various radioisotopes.

At noon on 6 April of last year, shortly before the Malvinas [Falklands] War, a high-ranking Soviet official, Victor Ivanovich Sharikov, who had come especially from Moscow, signed three agreements with the Argentine Atomic Energy Commission in the office of Admiral Castro Madero in Buenos Aires. The first was intended for "the supplying of enrichment services to obtain 100 kilos of 20 percent enriched uranium." A separate secret protocol specified the "services."

Photographed by the press and filmed by television, the reports about the signing of the agreements at the time mentioned only the two less important contracts: the sale of "various radioisotopes" and of 1 ton of Soviet heavy water to Argentina. However, the DIARIO OFICIAL published all the contracts but apparently not even the U.S. Embassy in Buenos Aires understood what had happened.

Haig and Galtieri

A military informant told me that after the occupation of the Malvinas by Argentina, General Galtieri and Admiral Jorge Anaya feared that the U.S. Secretary of State General Alexander Haig would ask them about the uranium enrichment contracts signed with the USSR. It is said also that the dictator, excited by whiskey, discussed the subject roughly with Anaya in the Casa Rosada shortly before the meeting with Haig. "You people (of the Navy) invented the crap [as published] about an atomic agreement with the Russians and I am the one that is going to put up with Haig if he spits that in my face," bellowed Galtieri.

However, Haig never asked about the matter.

Why the Soviet aid? Simply because of the game of the superpowers. In 1978, when the Argentine military dictatorship (accused of repeated violations of human rights) officially refused to sign the international treaty of nonproliferation of nuclear weapons, President Jimmy Carter suspended the sale of 20 percent enriched uranium intended for the reactors of the nuclear plants and the Argentine research centers.

The USSR, which at that time was already the world's biggest buyer of Argentine grain and meat, began gradually to occupy greater space in its very close commercial and diplomatic relations with the Argentine military dictatorship.

Fifty-three kilometers southeast of Bariloche, there are no flowers or plants. The ground is stony, the mountains rocky and high, one falling upon another, with their peaks snowy white in the middle of the December summer. In that deserted panorama is hidden the Pilcaniyeu plant, the secret place away from the world where the Argentina National Atomic Energy Commission is developing the uranium enrichment technology to arrive at the nuclear bomb.

The place is impregnable. The road is of dirt, dusty, full of potholes. Perhaps it does not have more potholes because of a lack of space in the road which has room for only one car. Around, within a radius of tens of kilometers, no inhabitant, no house, no animal.

Suddenly, through the thin and poor vegetation, of a brownish green, weathered by the snow of winter and the sun of summer, there emerges an immense gray iron bridge spanning a gully. On the other side of the bridge, everything changes: the road is paved and some meters further the barbed wire fences and the soldiers of the national gendarmerie prevent the access of anyone.

Even Contrado Baroto, director-president of Applied Research (INVAP), the state company that serves as a cover and a screen for the Pilcaniyeu Atomic Center, only enters with a special "pass."

Fake Factory

Sao Paulo O ESTADO DE SAO PAULO in Portuguese 4 Dec 83 p 12

[Text] Organized at the end of 1976 in an agreement between the Rio Negro Province (governed by the navy) and the Atomic Energy Commission (directed by an admiral), INVAP was officially presented until now as a factory for zirconium alloys (or zircalloy) used as the covering of the uranium dioxide capsules, the fuel of the nuclear reactors.

The real purpose of the modern buildings of Pilcaniyeu was falsified and no alloy was ever manufactured there. The residents of the humble neighboring villages—Pichileufu and Pilcaniyeu itself—still complain about the "factory" that did not employ anybody in the region. Everything came from Bariloche and Buenos Aires, from material to personnel, by train or highway.

In Bariloche, a number of INWAP's administrative employees supposed that the mountains hid a torture center or a concentration camp for political prisoners. The director of the company himself, Conrado Baroto, reinforced that supposition, limiting himself to explaining that not even he could visit the "factory" for reasons of "national security."

The two Pilcaniyeus are the synthesis of these last 8 years of Argentine life: the military impoverished the country and enriched the uranium.

It is impossible to estimate the exact time, but in 4 or 5 years Argentina could have the bomb if President Raul Alfonsin does not radically change the direction of the nuclear program. The problem is that the nuclear plans were conceived in such a manner that the peaceful use and the military development of atomic energy became interdependent and parallel roads in which one point leads to the other.

Technically, everything depends on the amount of 97 percent enriched uranium to be obtained from the secret plant in Pilcaniyeu. The enrichment process by gaseous diffusion is slow and the operation must be repeated hundreds of times, requiring much time and much electricity.

Admiral Castro Madero declares that the plant (the construction of which consumed \$62,585,000) will produce 20 percent enriched uranium useable in common reactors. An enrichment of 97 percent is necessary for nuclear devices. The inspection and control made by the International Atomic Energy Agency, with headquarters in Vienna, however, are much more an intimidating formality than an actual action.

Atomic Power

The director general of that organization, the Swede, Hans Blix, inspected Pilcaniyeu and the other Argentine nuclear centers and plants on the last week of November but he was able to learn little of what happens in the rooms with armored doors other than to confirm that Argentina is the most advanced Latin American country in the nuclear area. The only two nuclear plants in Latin America are Argentine: Atucha-I (100 kilometers northwest of Buenos Aires) with 347 megawatts of power, and Embalse, in Cordoba Province, built by an Italian-Canadian consortium and put into operation in May of this year, with a power of 640 megawatts.

The Atucha-II Nuclear Power Station, under construction, will produce 600 megawatts.

Created in 1950 by the then President Juan Peron, the Atomic Energy Commission in the course of 33 years has organized systematic work in the areas in which it operates, from the uranium mines to the plants, and including research centers, nuclear medicine, the training of professionals and factories of nuclear material.

In terms of uranium, the Sierra Pintada mine in Mendoza Province means the same as the Serra Pelada in terms of gold in Brazil (they are similar even in name). There are at least eight other uranium deposits in different places.

Uranium dioxide is manufactured with German technology in the city of Cordoba. The nuclear fuel elements, the capsules of uranium dioxide which fuel the reactors, are manufactured in the Constituyentes Atomic Center and in the Ezeiza Atomic Center in Buenos Aires.

The Bariloche Atomic Center has experimental research reactors in addition to an institute for training nuclear physicists and engineers. Despite all of that organized development, the problem of nuclear wastes continues. Up to now, the irradiated fuel is being stored in immense water tanks 20 meters deep.

However, the solution is provisional. And the atomic waste appears to be a progressive problem, gradually as grave and serious as the steps of those who dream about the nuclear bomb.

Argentina is now the eighth country in the "atomic club" and its nuclear progress is obvious and undeniable. However, many doubt that uranium enrichment has already been achieved in Pilcaniyeu.

"In 1950, Argentina was already so advanced in nuclear technology that the government announced that we had the bomb," said Federico Westerkamp, a critic of the present nuclear plan, recalling the fiasco of 32 years ago, when the then President Juan Peron announced "to the world" that his country had developed a medium-power bomb in the Bariloche Atomic Center.

At that time, only the United States and the USSR had the bomb and, with a lot of fanfare in the presidential palace, Peron decorated Austrian nuclear physicist Ronald Richter, "the father of the Argentine bomb." Richter had been brought to Argentina by Peron in 1947 to develop a nuclear project in Bariloche in improvised laboratories in a pioneer but ingenuous or adventurous project.

In 1951, Richter himself discovered that he had made a mistake in his calculations, in the experiments, the conclusions and the interpretations. He confused chain explosion through fusion with chain explosion through fission, which is what occurs in a nuclear device.

In truth, the "bomb" guarded by soldiers in a shed encircled by barbed wire was only a crude reactor that operated backwards.

The Fight for and Against the Bomb

If it depended on all the people or the personal will of Raul Alfonsin, Argentina would channel all of its nuclear plans toward peaceful purposes only. However, there is a frenzy of success in some scientific and political sectors so that it is venturesome to declare that the megalomaniac fantasy of the "A-Bomb" will disappear when the military leave power next Saturday.

One of the nuclear affairs advisers of the future Radical Civic Union government, physicist Roberto Peraro, for example, believes as did the previous dictatorial governments, that Argentina should not sign the treaty

on the nonproliferation of nuclear weapons: "This treaty seeks to disarm the disarmed," he said, implying that the bomb would be a demonstration of "independence."

The physicists, engineers and economists who make up the Association of Professionals of the Atomic Energy Commission believe the contrary. In a public manifesto, they called for a law "that will guarantee the peaceful use of nuclear energy and the express prohibition of its application for military purposes."

The former governor of Buenos Aires Province, Oscar Alende (former party colleague of Alfonsín and today the leader of the leftist Intransigent Party) called on the president to "demilitarize" the Nuclear Energy Commission.

Admiral Carlos Castro Madero seeks to save the situation and stresses that the established program "is peaceful" because construction of the bomb requires "another type of logistics and installations which Argentina does not have or plan to have."

But who says it does not have them? The Argentine military kept the Pilcaniyeu secret and it would be naive to think that they would now reveal an even bigger secret.

Civilian Control Demanded

Sao Paulo FOLHA DE SAO PAULO in Portuguese 23 Nov 83 p 15

[Text] Rio--In view of the development of nuclear technology in the two countries, the Brazilian Physics Society and the Argentine Physics Association yesterday released a joint statement in which they demand that the control of nuclear technology for peaceful purposes be carried out by civilian society, with complete detachment from the military area and they reject any action that can unleash a nuclear arms race in the two countries.

The announcement of the mastery of the uranium enrichment technology through the gaseous diffusion process by Argentina left the physicists dismayed and was made by the Buenos Aires government a few hours after the conclusion of the meeting of the Argentine Physics Association, the first after several years because of the dictatorial government which had dispersed the scientific community. After a week of discussions, including with government officials, the physicists knew nothing about the research on the gaseous diffusion process for the enrichment of uranium conducted secretly by the government.

Brazilian physicist Moises Nussenzvig, who participated in the meeting, revealed that secrecy is being maintained about the present phase of the undertaking. Proof that the Argentine physicists did not know anything about the research, said Nussenzvig, is that physicist Alberto Ridner of the Bariloche Atomic Center revealed during the meeting that the decision to build nuclear devices is only political since, with the technological

development that is envisaged, Argentina will be in a position to produce such devices on the basis of the process of reprocessing the uranium spent in the nuclear plants. The reprocessing plant will be completed in September 1985 under the command of an army officer, while the rest of the nuclear program is controlled by the navy.

Richter had been prohibited by the Argentine National Nuclear Energy Commission (CNEA) from giving his lecture on nuclear explosives, being released later provided he assumed responsibility for any consequences. In speaking of the reprocessing process, the physicist was not thinking about achievement of the construction of nuclear devices through the enrichment of uranium.

The president of the Brazilian Physics Society, Ernando de Souza Barros, believes that with the inauguration of President Alfonsin all of the details on the development or uranium enrichment will be clarified. During the meeting, it was learned that Argentina is conducting a feasibility study through the CNEA for the development of a nuclear reactor intended for the propulsion of submarines, which can also be utilized in ships. This type of reactor has to be small, utilizing 20 percent enriched uranium.

Nussenzvig revealed that the president of the CNEA, Admiral Castro Madero, did not attend the meeting, sending as his representative the Planning and Coordination Director Alejandro Placer, who limited himself to reading a text in which he described the evolution of all nuclear nonproliferation treaties and the reasons why Argentina did not sign them. The topic Nuclear Program was changed to Nuclear Policy.

Brazilian Cooperation With Argentina

Sao Paulo FOLHA DE SAO PAULO in Portuguese 23 Nov 83 p 15

[Text] Brasilia--Mines and Energy Minister Cesar Cals yesterday acknowledged the possibility of cooperation between Brazil and Argentina in the development of the uranium enrichment process through gaseous diffusion, the technology of which has already been gained by the Argentines without the help of any country.

"Brazil does not want to remain bound to a single uranium enrichment technology (the jet-nozzle process that is being developed together with the Germans) and is prepared to seek other technologies including the gaseous diffusion technology," said the minister. According to him, the Brazilian Nuclear Corporation (NUCLEBRAS) is developing the jet-nozzle process with the Germans because Germany was the only country that agreed to transfer nuclear technology.

The minister declared also that he was not familiar with the Argentine nuclear program but said he did not believe that country plans to build nuclear bombs as a result of the development of enrichment technology. According to experts in that sector, the process developed by Argentina makes it possible

to enrich uranium to 1 percent, whereas to build nuclear explosive devices the enrichment has to be a minimum of 97 percent.

Probable cooperation between Brazil and Argentina in the uranium enrichment sector will be possible as a result of the cooperation agreement for the development and application of the peaceful uses of nuclear energy signed in Buenos Aires in 1980 during the visit of President Figueiredo.

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CSO: 5100/2040

BRIEFS

NUCLEP EQUIPMENT TO ARGENTINA—The lower part of the reactor vessel of the Atucha II nuclear power plant is ready for shipment to Argentina; this component was built by NUCLEP /NUCLEBRAS Heavy Equipment, Inc/ (the NUCLEBRAS affiliate responsible for that type of equipment). Two small components of that vessel are being built by the German firm, Kraftwerk Union, in Germany and by another in Spain: in Germany, the top cover; in Spain, the ring which connects the lower part (the vessel proper) to the cover. These two components are in the final stage of completion. /Text/ /Sao Paulo O ESTADO DE SAO PAULO in Portuguese 31 Dec 83 p 21/ 8568

CSO: 5100/2054

REPORT ON NATION'S DEVELOPMENT OF NUCLEAR TECHNOLOGY

Industry's Role in Nuclear Plan

Buenos Aires LA PRENSA in Spanish 9 Jan 84 p 6

[Text] Two outstanding events marked the activity of the National Commission for Atomic Energy [CNEA] during 1983: the opening of the Embalse nuclear powerplant in Cordoba Province, which took place on 3 May, and the announcement made on 16 December by the then chairman of the Commission, Vice Adm Carlos Castro Madera, that Argentina is equipped to produce enriched uranium.

The Embalse nuclear powerplant is the second one for our country. It has a power of 600 electric megawatts and uses natural uranium as fuel and heavy water as a moderator and coolant. There was considerable participation by native engineering and industry in its construction.

The production of enriched uranium using the gaseous diffusion method was achieved as a result of our own development. At the present time, all the nuclear electric powerplants in the world of the enriched uranium and light water type are supplied by fuel obtained through the method developed in our country.

Simultaneously with the opening of the Embalse powerplant, the Colloquium of Latin American Atomic Energy Authorities was being held in our capital. During the course of it, engineer Miguel Angel Pagani, representative of the local manufacturing firms on the task force for the study of the first stage of the fourth nuclear powerplant, gave a dissertation on "The Role of Industry in the Development of the Argentine Nuclear Plan." Following is a summary of his remarks:

It is extremely difficult to discuss what has been accomplished by any nuclear service entity in Argentina without in some way reviewing the record of the National Commission for Atomic Energy. This record is typified by two events: the first includes the accomplishments, from the first laboratory achievements to the establishment of the nuclear powerplants. The second includes the Commission's influence on taking the action that accompanied this growth. The most prominent feature of this record is that CNEA has imposed the criterion of "learning by doing," rejecting the spurious solution of "exclusively

purchasing," something that would have resolved its immediate needs, but would have delayed the development of a knowledge of the field.

At its beginnings, CNEA took on programs related almost exclusively to research and development, wherein its first technicians and professionals relied, for the fulfillment of their requirements, on a group of companies, generally small ones, which were starting to discover the incipient nuclear industry. The achievements were increasing in significance, CNEA's needs were being publicized and the close association with industries became easier, but always clashing with the real fact that the laboratory is one thing and productive activities are something quite different. The experimental reactors were perhaps the first big step taken by the Commission, not merely from a scientific standpoint, but also as a focal point of interest for industry.

The accomplishment of these projects took place almost solely with the effort of Argentine personnel, defying risks and successfully proving the great capacity of the technicians and professionals, the success of the native industry's undertakings and, in particular, the correctness of those who at that time had the great responsibility of making decisions. The progress was preceded and at all times accompanied by suitable programs to train and qualify personnel, which spread like a "scientific infection" to other study centers.

A few pilot facilities were added to the experimental reactors, either on the level of preliminary plans or on that of concrete programs such as radioisotope production or that of uranium concentrate, with the preliminary work that this entails, such as prospecting and exploitation of deposits. All the work that has been outlined was what made possible, in some way, the technological leap represented by the undertaking of projects for nuclear powerplants. This necessitated ascertaining as accurately as possible the capacity for a response among various areas of industry; something that also led to an evaluation of the social impact that this would cause.

This is reflected in its entirety in two types of action taken by the Commission: undertaking the feasibility study for Atucha I with its own personnel, and forming the task force for Technical Assistance Service to Industry, a cause of the major native participation attained in the first Argentine nuclear powerplant. Atucha I caused an extremely great impact on native industry. The good negotiation of the contract with the supplier of technology made it possible to "open the package with the black box" and convert it into a "gray box" as it was explained by Professor Sabato, engineer Wortman and Gargiulo, in their report prepared for the OAS. The native participation in Atucha I amounted to approximately 38 percent of the direct cost of the project in terms of money, thanks to the device of opening the package, representing an attempt to procure the most efficient participation by the local effort. Its direct and indirect effects on various aspects of the Argentine situation were highly significant, far greater than expected and totally disproportionate to the amount of overinvestment made. In the first place, with regard to technological advances, in manufacturing and inspection procedures and methods, techniques for welding stainless steel under inert gas

with "clean" conditions, structural steel welds based on the construction code's strictest quality specifications, new techniques for metal finishing, new security criteria for construction of systems under pressure and modern inspection concepts were some of the advances incorporated into the Argentine metal and electromechanical industry owing to its participation in Atucha I. Three different types of instances may serve as an example: a. the construction of a shop for welding stainless steel receptacles and exchangers under "clean" metallurgical conditions; b. the status of an international supplier for the manufacturer of pipes for the capacitor who, since then, has been able to participate in major international bidding competitions; and, c. the procurement of several patents on the part of the supplier of cable-hanger pans.

An additional benefit was the scientific and technical training of a group of professionals who participated actively, first in Europe and later at Atucha, in the construction, inspection and installation of the nuclear powerplant; which made it possible, when the contract for the second nuclear powerplant was prepared, for the Commission to put together a team of 80 very well trained professionals, whereas, when the contract for Atucha I was prepared, CNEA had been comprised of only 15 persons.

A similar effect was noted on the local industry, which realized that its incorporation into the Argentine reality was not something for the distant future, but rather an immediate necessity.

Not only has the "demonstrating" effect of Atucha I influenced other major public works, and is still influencing them, but also it has had a particular influence on the conception, formulation and passage of Law 18,875, called the Buy National Law, the precedent for which is Decree Law 5,340 on Buy Argentine. In addition, as we have noted, it encouraged the technification of the native industry, which was later able to use its new experience in some fields other than the nuclear one. Moreover, it enhanced the local understanding of the handling of contracts for major projects, wielding a significant ideological influence over other sectors of the state which had problems of similar dimensions. This accomplishment, which is difficult to gage, also helped to make the local services rendered in other sectors rise proportionately in size and quantity. Finally it should be stressed that the Atucha I experience helped to undertake the second Argentine nuclear powerplant with greater opportunities. It afforded gearing the "gray box" of Embalse to the greater ambition for native participation, amounting to approximately half of the total project in monetary terms. As for Atucha I, increases were noted in the native electromechanical supplies, which rose from 12 to 33 percent; the provision, for the first time, by Argentine industry, of instrumentation and control equipment for nuclear powerplants; and a far greater responsibility than in Atucha I, insofar as engineering, quality control and manufacture of components were concerned. Note should be taken of what it means to talk about a 50 percent share of a sum estimated at approximately \$1.5 billion.

At the same time, the experience gleaned has afforded new prospects for what will be the development of the Argentine Nuclear Plan which, although they are not yet very well known, are indeed promising. Concurrently, other major

projects relating to the Commission's activities were carried out, particularly those associated with the fuel cycle and the exporting of technology. Noteworthy among them are those involving the special alloys factory, the fuel elements factory, a heavy water pilot plant, a high pressure experimental center, a laboratory for radiochemical processes, a uranium concentrate factory, the Peru atomic center and the Sierra Pintada manufacturing plant.

Added to this was the creation of ENACE (Argentine Nuclear Enterprise for Electric Powerplants, Inc), in which the supplier of the technology for Atucha II and CNEA participated. This company is responsible for acting as an "industrial architect," balances the interests at stake and makes it possible to achieve a desired goal: having autonomy for decision-making in the field of nuclear powerplants.

At Atucha II, for its part, under so-called service contracts, company personnel were trained at the expense and order of CNEA in such special fields as nuclear piping, plant lay-out and ventilation. It should also be stressed that although one can estimate a participation by the local industry of the same type as that in Embalse, contracts are under way with native companies, representing a genuine leap in the quality of the services rendered, those associated with the large components being particularly noteworthy.

In the preliminary studies on what will be the fourth Argentine nuclear powerplant, an attempt is being made to ascertain as clearly as possible what can be produced in the country and what might be made throughout the Nuclear Plan, so as to ensure the possibility of increasing the participation.

CNEA has always had as a fundamental criterion the use of large projects as a vehicle for fostering the development of the local industry; and, in particular, with respect to the fourth nuclear powerplant, an innovative event has occurred: The Argentine manufacturers are operating jointly and organically with CNEA in the preliminary studies, establishing and upholding the greatest possible amount of native participation.

Quihillalt On Technology Export

Buenos Aires LA PRENSA in Spanish 9 Jan 84 p 7

[Text] One recalls, concerning engineer Oscar A. Quihillalt, his record of over 15 years heading the National Commission for Atomic Energy, and his outstanding participation in both national and international forums in the field. At present, he is serving as president of NUCLAR, Inc. The company has recently been working on the Embalse nuclear powerplant, providing engineering and construction, which are the two most important activities being carried out. The work was done over a 5-year period, and during the course of it, a capacity for executing really important nuclear projects grew in NUCLAR.

When questioned about this year's prospects for Argentine nuclear achievements associated with the area of the specialized companies, engineer Quihillalt

replied that his firm is currently working for the Atomic Energy Commission and companies associated with it, such as ENACE, which is concerned with the industrial architecture at Atucha II, and, in addition, for Italian and Canadian firms. He added that, "If the specific budgets for this year are cut, that would mean less activity for our firm, which has us a little worried, because the major activity being carried out, namely, the construction of Atucha II, has already been delayed over a year with respect to the plans that have been devised, and the same thing has occurred at the Arroyito heavy water plant, in which we have a large amount of participation."

After stressing that NUCLEAR is keeping its potential intact and that there is among its members an enormous desire to work, he described an incident which reflects the magnitude of Argentina's progress in the atomic field: "Egypt called for international bidding to build a nuclear powerplant, the El Dabaa, 130 kilometers from Alexandria, which prompted a response from French, German and American companies. NUCLEAR, in a consortium with PESCARMONA and ARGATON, was invited by a large American firm to participate in a portion of the project. PESCARMONA would supply components, and NUCLEAR and ARGATON would provide engineering and construction, as occurred in the case of Embalse. Egypt also requested financing. Independent of PESCARMONA, our share of the input was about \$150 million, a sum procured at the outset through financial from the Central Bank obtained with backing given to us by the then head of CNEA, Castro Madera. The arrangement with the bank was based on the assumption that this amount would not be needed until 1987, and it was considered that the country's financial status would improve sufficiently. In short, it involved a transfer of our technology to Egypt; and this is the first time an incident of this magnitude has occurred, because we are not selling products, but rather sending highly specialized personnel. The invitation filled us with enthusiasm and pride; and 30 engineers and many technicians worked on the project. We submitted the bid, it was studied, and it was found that both the financing and our technological contribution were excellent. Personnel was even brought from Egypt to advise us on matters relating to the living conditions in that country, what the costs were like, schools for children, camps, housing, etc.; covering everything that it would mean to send technicians and become established for several years. I recently traveled to the United States, and met personnel from the American companies participating in the project, who informed me that our offer was extremely interesting, but that it could not materialize because the Congress of the United States had put us on a list of five countries with which work could not be done. They added that this legislative decision was forcing them to dispense with the Argentine participation."

Regarding the basic reasons for his visit to the United States, he said that it was due to the fact that a group of private companies in that country was attempting to obtain a general opinion for the nations which have not yet signed the nuclear non-proliferation treaty to have an opportunity to do so. This is due to the fear of those firms that such a strict American policy on proliferation would prevent them, as it is, from selling atomic powerplants on the international market as France and Germany are doing. Therefore, they assigned seven prominent individuals to draft a document which was later

distributed to 20 individuals from all over the world, one of whom was engineer Quihillalt, whom they invited to come to California to discuss it. He added: "I did so, and pointed out that the document lacked the grounds and the appropriate language to succeed in making the countries which have not signed non-proliferation agreements agree to do so. I said that it was necessary to talk sincerely, assessing the reasons which prompt refusal to sign that treaty, adding to it the transfer of technology which had been omitted and which could be an important ingredient for an acceptable solution, etc. I was congratulated for my idea's having been the only viable one submitted. The next day, of course without bearing any direct relation to what had happened at the previous meeting, I was informed of what I have already noted: that we could not participate in the Egyptian powerplant."

He remarked: "All this took place 2 months ago."

In conclusion, engineer Quihillalt stressed the significance of the preliminary acceptance of the offer for this nuclear project, in any event, saying: "This clearly demonstrates the country's potential and prospects in the field."

"We shall not be discouraged by what has occurred; it is only an incident, and we shall continue our attempt to give an impetus to the transfer of technology, both by putting our own at the disposal of those who request it, and by carefully selecting the foreign type that is most feasible for us to introduce."

Expansion Plans

Buenos Aires LA PRENSA in Spanish 9 Jan 84 p 6

[Text] "The plans for Argentina's electrical equipment call for maximum utilization of water resources, the use of energy sources such as coal and gas to replace oil and the development of nuclear powerplants. These plans, especially with respect to those powerplants, specify the increased use of the native industry's production capacity. Ansaldo is offering its cooperation to accelerate this growth in all sectors associated with its activity, which includes areas ranging from plant engineering to the supply of component equipment for it, as well as installation and putting into operation." This statement was made by one of the board members of the aforementioned firm, when interviewed on the occasion of the publication of this special page.

He added that, with regard to the sectors linked with the nuclear electric area in particular, the experience gained, especially in the field of technology, has put the firm in an optimal position for taking a proper approach to all the aspects and determinations inherent in transfers of technology.

He also remarked that the company, which has installed a total of 3,800 MWe in nuclear powerplants (Cirene, Cernavoda, Caorso, Montalto, Superphenix and Pec), carries out its activities through a group of entities which make up the group and which are operating in the following sectors:

Management of nuclear and conventional projects;

"Turn-key" supply of powerplants or groups of complete systems;

System engineering and components;

Development and rating of systems and components;

Manufacture of components;

Pressure tanks, pressurized calandrias, steam generators, exchangers, internals, mechanisms, turbogenerators, capacitors, low pressure and high pressure heaters, pressure tanks, motors and transformers.

The main nuclear components ordered from the Ansaldo group's firms, based on MWe, are listed as follows, in Italy and abroad: pressure tanks, 4,800 and 8,300; steam generators, 2,000 and 8,700; internals, 3,000 and 3,000; pressurizers, 2,000 and 4,000; and nuclear turbogenerators, 3,000 and 1,900 (640 MWe in Argentina). Including pressure tanks, steam generators and pressurizers, there are 28 components ordered by German companies for projects headed by firms of the same nationality.

The board member added: "Hence, our group has long, successful experience in the development of technology for the engineering in nuclear powerplants, engineering and manufacture, and quality control and guarantee of both nuclear and conventional components. This experience is particularly beneficial because it enables us to focus correctly on the problems associated with transfers of technology." Based upon its experience, the firm believes that the most important terms to uphold in order to achieve an effective transfer of technology to Argentina are the following:

- a. To work in the context of a plan for electrical equipment that will make it possible to plan guidelines for increased native integration.
- b. To channel to our country the basic information that will allow for zonal development with the means for exporting products with a high degree of value added.
- c. To establish a very close relationship among the companies, transcending the mere transfer of technology, such as that involving training of technical cadres and joint participation in projects abroad.
- d. To plan and execute research and development activities in the country, including the necessary renovations to constantly update the procedures involved.
- e. Having available very valuable human resources such as those that the country possesses.

The informant concluded by saying: "We believe that all the aforementioned conditions could be present in Argentina and, for our part, we are willing to implement the sequences and methodologies that will make the necessary transfers optimal."

Cement Industry Participation

Buenos Aires LA PRENSA in Spanish 9 Jan 84 p 7

[Text] Supercemento, Inc, is a company that has made a large technological and human contribution to the development of nuclear energy in the country. For example, it was responsible for the manufacturing of the piping for the water intake conduit at the Rio Tercero atomic powerplant. The project consisted of an underwater excavation 775 meters long and 30 meters wide of sill, using a dredge, with rock-fill consisting of (non-commercial) ball rock and a material foundation. Reinforced concrete conduits measuring 3.80 meters in internal diameter, manufactured in the work platform area, using artificial steam curing, were set on it. In the intake area, an apron was built on which the metal intake nozzles made "on site," then towed and sunk, were installed. At the Atucha I nuclear powerplant, the firm participated as a supplier of precompressed concrete piping with an internal diameter of 700 millimeters and 5 meters long, of the plug and socket type, with double socket pipes, special parts and rubber rings. Together with the piping supply, technical advice was given for its proper installation.

Also, during 1975-79, the company engaged in engineering work in various fields (civil, mechanical, electrical and instrumentation), performed for the Rio Tercero Embalse nuclear powerplant, exceeding a total of 300,000 man/hours of engineering.

In the civil area, the work included projects and studies, with their static calculations of structures and plans for forms and assembly, associated with buildings for auxiliary boilers, emergency generators, storage and pumping of diesel oil, housing for a fire-fighting pump, water treatment plants etc.

In these buildings and areas, the bases were calculated and designed for cells, emergency generators, storage tanks and log books on diesel fuel, pumps, pipe supports, trenches, etc.

In the turbine building, in the auxiliary bay, bases were calculated and designed for various types of equipment, such as compressors, pumps, receptacles, tanks, supports, trenches for piping and cables, etc. In addition, the complete plan was made, with static calculations, backup terrain study, plans for forms and assembly, design of the supports for the piping and the intake, relating to the coolant water intake conduit, consisting of two pipes 3,800 millimeters in diameter and 800 meters long, with their intake at a depth of approximately 21 meters.

Also finished was the complete plan of the spillway channel, with its weirs and bridge, relating to the powerplant's coolant water system.

The firm, in turn, was contracted for engineering work associated with the thermal cycle and auxiliary services, electrical installations, telecommunications, instrumentation, remote control and logic for the nuclear powerplant itself.

Readjustment of Electromechanic Industry

Buenos Aires LA PRENSA in Spanish 9 Jan 84 p 7

[Text] The native industry has had to equip and prepare itself technically to contribute to Argentina's nuclear development, based on increasingly greater autonomy and self-sufficiency. For this purpose, the electromechanical industry in particular (manufacturer of electric engines and generators) has had to expend an effort to adapt to the unique requirements for security and reliability imposed for every element used in nuclear powerplants.

Noteworthy among these strict requirements is what has been called "quality assurance," which on its various levels specifies increasing conditions for quality control. Level 1 of the quality assurance, which is its maximum level, demands careful checks and records in all phases of execution of the supplies: administrative, supply engineering, manufacture and inspection.

At the Embalse nuclear powerplant, native industry has had a leading role. Among other Argentine firms, Tenas, Inc. has been the exclusive supplier of engines up to 750 kw and 6600 V, with a level 1 rating of quality assurance for the moderator and cooling shutdown systems.

In addition to the quality requirements inherent in the security systems, it was necessary to consider unusual operating conditions, for example, absorbing hydraulic pressures of about 18 tons caused by the pressurization of the coolant circuit.

All the engines manufactured for this supply were sent to Austria to be tested on the pump manufacturer's test loop, with satisfactory results.

The company has also provided a variety of engines and generators for the conventional part of the same powerplant. In this case, although a level 1 quality assurance is not required, the engines are subject to the demanding operating conditions of the auxiliary equipment of electric powerplants.

Examples such as those cited indicate the native electromechanical industry's capacity to gear itself to the needs of the Argentine Nuclear Plan, often replacing material resources in short supply with the ingenuity and perseverance of its members.

Nuclear Fittings Enterprise

Buenos Aires LA PRENSA in Spanish 9 Jan 84 p 7

[Text] Board members of the firm Casucci, Inc. have reported that, in over 20 years of persistent effort, they have developed the proper technology, equipped themselves with the most modern quality control systems and trained professionals, technicians and workers to become, at present, the only manufacturer qualified to supply fittings to be used in the nuclear area.

They added that they have developed and produced, with native labor and raw materials, the Heraseal fittings for every type of pipe connections in dangerous areas, under extremely harsh operating conditions, for automatic measurement and control of processes in nuclear plants.

They said that these fittings ensure a seal free from losses and an extremely small transmission of torque to the pipe, and are self-aligning. The pipe is firmly guided and aligned between the guide at the base of the fitting body, the two collars and the nut guide. The two collars tighten and roll the pipe gently and firmly so that the constriction of the pipe is virtually nil; which ensures a minimal restriction in the volume of flow of the fluid. They explained that the secret of the fittings consists of the fact that the closing action moves axially along the pipe instead of rotatingly. In this way the transmission to the pipe of torque movements and remaining torque stress which, in time and with vibrations, could even loosen the nut and cause losses, is avoided.

2909

CSO: 5100/2058

ARGENTINA

BRIEFS

CNEA WANTS BUDGET INCREASED—(NA)—The National Atomic Energy Commission (CNEA) has asked for a 200 percent increase in the organization's budget for this year, a request which was submitted to the Economy Ministry during a meeting yesterday between Finance Secretary Norberto Bertaina and members of the special Nuclear Energy Committee created by President Raul Alfonsin, which includes Foreign Minister Dante Caputo and Presidential Secretary German Lopez. [Text] [PY131505 Buenos Aires BUENOS AIRES HERALD in English 12 Jan 84 p 11]

NEW CNEA CHIEF—Engineer Alberto Rafael Constantini was sworn in as president of the National Atomic Energy Commission today at 1230. The ceremony was conducted by President Raul Alfonsin in the presidential office of Government House. [Text] [PY191702 Buenos Aires Domestic Service in Spanish 1600 GMT 19 Jan 84]

ALFONSIN: NUCLEAR PROGRAM 'PEACEFUL'—Buenos Aires, 19 Jan (TELAM)—President Raul Alfonsin today reasserted that the Argentine nuclear program will have peaceful purposes, and that in no way will it be developed for military purposes, and that from now on the Congress will be in charge of outlining CNEA's [National Commission for Atomic Energy] policies and objectives. [Excerpt] [PY202145 Buenos Aires TELAM in Spanish 2016 GMT 19 Jan 84]

CSO: 5100/2061

BRAZIL

ANGRA-I OPERATION HALTED DUE TO PIPING, VALVE PROBLEMS

Sao Paulo FOLHA DE SAO PAULO in Portuguese 25 Nov 83 p 12

[Text] Rio--The Angra-I nuclear plant has been shut down for 1 week due to new leaks--this time in the sea-water tubing that passes through the steam condenser in the secondary circuit--and due to the bad operation of some valves. This was revealed yesterday by the president of Furnas Electric Power Stations, Licino Seabra. At the time the leak occurred, the Plant was operating at 50 percent capacity.

The steam condensor is divided into four tight parts that can be isolated for any repair without the necessity of shutting down the plant. However, Seabra revealed, the valves that close one of those compartments did not operate properly, letting the water pass and preventing the repair from being done. Thus, the whole plant had to be shut down and will resume operation next week.

A little over a month ago, a steam leak with a later error on the part of an operator in handling the valves caused a drop in the water level of the pressurizer, activating a safety system. Whenever the plant is shut down, the National Nuclear Energy Commission has to authorize its reentry into operation. Despite the two recent accidents, the president of Furnas believes that there is still a chance that the plant may operate at full load at the end of the year.

The experts of Furnas and Westinghouse, the company that supplied the equipment, are still analyzing the causes of the latest leak. Licino Seabra revealed that the valves had jammed and did not discount the possibility of a deterioration of the equipment due to the time the plant remained inoperative.

Scheduled to go into operation in 1977, the Angra-1 nuclear plant accrued a delay of more than 6 years, which means a financial loss in the order of \$200 million per year.

8711

CSO: 5100/2039

BRAZIL

NUCLEP SUBMITS BIDS FOR PLANT CONSTRUCTION IN TURKEY

Rio de Janeiro JORNAL DO BRASIL in Portuguese 1 Dec 83 p 16

[Text] The NUCLEBRAS Heavy Equipment Corporation (NUCLEP) has just completed the construction of its first major piece of nuclear equipment: the pressure vessel for the Atuch-2 plant, a gigantic piece weighing 280 tons, 8 meters in diameter and made of steel 29 centimeters thick.

The pressure vessel, worth \$2.5 million marks, has been ready since the 8th of last month and is awaiting the instructions of the customer--the Argentine National Atomic Energy Commission--to be shipped through NUCLEP's own maritime terminal in Itagua which has a capacity to move pieces weighing up to 1,000 tons (the only one in the country with that capacity).

New Order

The director-superintendent of NUCLEP, Alfredo do Amaral Osorio, said he hopes to receive a new order from Argentina also connected with the pressure vessel for Atucha-2. It is the junction of the piece built by NUCLEP--which is the lower part of the pressure vessel--with the upper part, called the mouth flange, which is being built in Germany. "We have the capability to weld the two pieces," said Amaral Osorio.

He stressed that the experience of manufacturing nuclear equipment intended for export was very successful: the piece was ready strictly within the term contracted with Argentina and there was no error in any of the stages of construction that required redoing anything. "In an industry of this type, building a piece of equipment without having to redo anything is something out of the ordinary," said Amaral Osorio proudly.

Yesterday, he received the director general of the International Atomic Energy Agency (IAEA), Hans Blix, for a visit of the factory. The IAEA official said he was "quite impressed with the quality of the NUCLEP facilities."

NUCLEP presented a bid to the KWU to be presented as a subcontractor of the German firm in competitive bidding to supply nuclear equipment for a plant in Egypt and another in Turkey. In addition, it has another bid, this one made directly, for the construction of two nuclear plants in Mexico. However,

the competitive bidding for those plants was suspended by the Mexican government owing to that country's economic crisis. "In any case, the bid is there for when Mexico can resume its nuclear program," said Osorio.

For the Brazilian program, which has also been slowed down, NUCLEP continues to manufacture at a slower pace equipment for the Angra-2 and 3 plants, both under construction, and for nuclear plant No 4, which would be Iguape-1, in Sao Paulo, but the construction of which has been stopped. Thus, NUCLEP is working on the four steam generators of plant No 4 within what it calls a "program of preservation of technology," intended to prevent the loss of technological knowledge acquired by the 489 Brazilians, including engineers, technicians and operators, already qualified to build nuclear equipment, because of the lack of practical utilization.

At a meeting Monday, the board of directors of NUCLEP, comprised of representatives of the Brazilian Nuclear Corporation (NUCLEBRAS) and its German partners, approved a report which envisages that, if the current timetable for construction of the nuclear plants is maintained, the company will not begin to show a profit until 1986.

8711

CSO: 5100/2039

BRAZIL

CALS COMMENTS ON LASER URANIUM ENRICHMENT TECHNOLOGY

Sao Paulo O ESTADO DE SAO PAULO in Portuguese 3 Dec 83 p 22

[Text] Brasilia—Mines and Energy Minister Cesar Cals confirmed yesterday that Brazil is developing uranium enrichment technology using laser rays but did not reveal if all of the laboratory stages have been mastered since the pace of the research diminished after the death in 1980 of the coordinator of the program, physicist Sergio Porto.

According to a source of the National Nuclear Energy Commission (CNEN) quoted by the JORNAL DE BRASILIA, that work has already been concluded successfully. The studies began in 1975 and involved the Energy and Nuclear Research Institute (PEN), the physics group of the University of Campinas (UNICAMP) and the Aeronautics Technological Center, in addition to the National Nuclear Energy Commission.

According to Minister Cesar Cals, with the death of Sergio Porto, one of the world's greatest authorities on laser rays, research was practically stopped because there was no time to train personnel to continue it independently. However, the work was not suspended. It only continued at a slower pace and was resumed by the CNEN which, in addition to technical difficulties, had other difficulties of a budgetary nature.

The enrichment of uranium by laser rays is a high-yield technique that consists of passing a beam of laser rays through a metallic uranium cloud. According to the frequency of the ray, Uranium-235 or 238 is catalyzed, thus obtaining the purified substance.

10 Years

At the time of Sergio Porto's death, enrichment by laser had not yet been demonstrated to be economically feasible. The keypoint in that technique is the process of vaporization of metallic uranium, which requires high temperatures.

Although it has not been officially confirmed by the Ministry of Mines and Energy, in the event that the process has been completely mastered in the laboratory, a minimum of 10 years will still be necessary to demonstrate its

commercial feasibility. The next stages to cover would be the conception and construction of a pilot-plant and, in the event that it operates properly, Brazil could set up the first plant for demonstration on a commercial scale.

The atmosphere of recession and cuts of public expenditures could further extend that minimum time of 10 years. Since Brazil has acquired from Germany the cascade uranium enrichment process--the jet nozzle--already in the precommercial testing phase, it is possible that the first national enrichment plant will use that.

8711

CSO: 5100/2039

FRENCH TO BUILD URANIUM CONCENTRATION PLANT IN ITATAIA

Sao Paulo O ESTADO DE SAO PAULO in Portuguese 30 Dec 83 p 27

/Text/ Fortaleza—Cesar Cals, minister of mines and energy, confirmed yesterday in Fortaleza that the French Government, through its ministries of industry and foreign affairs, will sign a contract with the Brazilian Government for the construction of a pilot plant for the exploitation of uranium and phosphate from the Itataia mine located in the municipality of Santa Querita, 255 km from Ceara's capital. According to Cals, an initial understanding was reached during this recent visit to France, and preliminary studies will be completed within 6 months.

The minister said that the establishment of the pilot plant will not incur any expenditure by NUCLEBRAS /Brazilian Nuclear Corporations, Inc/, the Brazilian firm which will handle negotiations with the French Government, and that the financing of the construction of the phosphate fertilizer complex, as well as the uranium concentration operation, will be paid by the Brazilian Government to the French Government by means of "mineral currency," that is, by presale of the products to be mined. He also said that Brazil will not run any risk inasmuch as the price of the ore will be fixed in accordance with the prices prevailing at the time of each operation.

After pointing out that the construction of the uranium and phosphate plant in Itataia was one of the ministry's principal objectives, Cals said that for each ton of uranium extracted there will be a yield of 150 tons of phosphate. In addition to the fact that the above-mentioned exploitation will bring economic benefits to Ceara and the area in general, such as employment and greater income, the minister believes that the Itataia plant will establish the north-east, particularly Ceara, as one of the principal focal points for Brazil's nuclear research.

Cals also said that the Ministry of Mines and Energy, together with the LPG Distributors Union (SINDGAS), is studying the possibility of building a plant for the processing of natural gas in the coastal municipality of Paracuru located 107 km from Fortaleza where offshore oil exploration is already underway yielding a daily production of 24,000 barrels.

With regard to the National Alcohol Program, the minister denied that there would be any incompatibility between fuel production and the number of automobiles being produced. The minister also said that another increase is foreseen for alcohol early in 1984. He said that the price of alcohol will be maintained until May.

IEN PRODUCTION OF INSTRUMENTATION EQUIPMENT DISCUSSED

Sao Paulo O ESTADO DE SAO PAULO in Portuguese 30 Dec 83 p 27

/Text/ Yesterday in Belem, Dario Gomes, president of NUCLEBRAS /Brazilian Nuclear Corporations, Inc/, deplored the cut of about 400 billion cruzeiros in the organization's budget for 1984; according to him, this will impede the beginning of the construction of the Angra III power plant next year. With regard to the manufacture of the Brazilian atomic bomb, he said that until 1990 the enrichment of uranium to be developed by the Angra I, II and III nuclear power plants will be insufficient for this purpose.

In Rio, Hilton Andrade de Mello, head of the Department of Instrumentation and Control of the Nuclear Energy Institute (IEN), asserted that this organization has now developed sufficient technology to produce equipment for the instrumentation of research and other reactors, thus making it possible to avoid borrowing \$10 million, as occurred this year. He also said that the technology developed by IEN is being transferred to our domestic industry at cost without profit inasmuch as the principal objective is to make it possible to produce such equipment, even eventually for export.

Andrade de Mello said that projects for the development of that kind of technology were stepped up last year when government officials increased the restrictions against foreign purchases. According to him, in view of the present situation, either Brazil would acquire the capability of producing its own equipment or its three research institutes—IEN, the Institute for Nuclear Research (IPEN) and the Center for Development of Nuclear Technology—would be deactivated.

Again according to him, the first step toward the industrialization of instrumentation in the nuclear sector was taken in December 1962. At that time the National Nuclear Energy Commission (CNEN), to which IEN is subordinate, transferred the manufacturing technology of a whole series of nuclear measures to our domestic industry.

"Aware of the country's great financial difficulties," he stressed, "CNEN stepped up the instrument and control project and carried out throughout the year a number of other important projects which are ready to be transferred to our national industry." some of the items he mentioned as being ready for transfer are: supplementary equipment for various nuclear measures, digital fluorometer for mineral analysis and multinational analyzer.

NUCLEAR PROGRAM DELAYED; PRIORITIES ESTABLISHED

PY060210 Sao Paulo FOLHA DE SAO PAULO in Portuguese 5 Jan 84 p 11

[Excerpt] Rio de Janeiro — Nuclebras President Dario Gomes has announced that the enterprise has canceled all orders for supplies that were to be placed this year. He said that construction of the Angra-2 nuclear plant will be slowed as much as possible, and that construction of Angra-3, scheduled to begin this year, has been delayed. He gave assurances that the uranium enrichment plant will not be affected because it has priority status within the nuclear program.

According to Gomes, the program has changed due to shortage of funds. The 1,067,000,000-cruzeiro budget allocates only 100 billion cruzeiros to investments and 855 billion cruzeiros to payments on foreign debts. Since it will not be possible to implement all the projects, priorities will be established. The project for construction of the uranium enrichment pilot plant, which will cost \$800 million and which is scheduled to begin operations at the end of this year, will not be delayed.

Dario Gomes said that he regards as discontinued the negotiations on the supply of pumps for the uranium enrichment pilot plant that were being held with French company Alsthom Atlantique. The technical specifications for the compressors will be drawn up after the pilot plant has been in uninterrupted operation for 6 months. Negotiations will again be held with the FEG. The French company was to have reported on clearance for exporting equipment before the end of last year, but it did not. Because the pumps must be ordered now for delivery in 2 and 1/2 years, Nuclebras will place the orders with the FEG, which has already developed the prototypes.

CSO: 5100/2053

FRANCE VETOES EQUIPMENT SALE FOR NUCLEAR PROGRAM

PY171620 Buenos Aires TELAM in Spanish 1906 GRIT 16 Jan 84

[Text] Rio de Janeiro, 16 Jan (TELAM) -- The Brazilian Government's determination to give priority to the industrial development of the nuclear fuel production cycle so that it can compete with Argentina in that field has caused the French Government to veto the sale of Alsthom turbines to Brazil.

The French decision was published today by the local daily O GLOBO in its Economic Panorama feature [item has not been observed in O GLOBO], and it adds that the Paris government used to support the Brazilian nuclear program and that it had even granted loans through local banks to purchase equipment.

Moreover, it indicates that up to 1 year ago the Brazilian nuclear program was giving priority to the construction of plants for energy production. The technology of nuclear fuel production was not the main objective at that time, as it is now, due to the competition with Argentina.

The article concludes by saying that Brazil has the alternative of resorting to the Germans, who manufacture turbines similar to the French ones and who can provide financing for Brasilia's nuclear program, something that they have been doing anyway.

CSO: 5100/2057

BRAZIL

PLANS ANNOUNCED TO MAKE IRIIDIUM-192 CAPSULES

PY201405 Sao Paulo FOLHA DE SAO PAULO in Portuguese 19 Jan 84 p 8

[Text] The National Nuclear Energy Commission yesterday signed contracts with two private enterprises, Brazilian Nuclear Technology Company and QUALITEC Environmental Engineering and Quality Control Inc, to assemble up to 100-curie iridium-192 waffles, which are used industrially in the quality testing of materials and equipment. These waffles are now being imported at an approximate cost of \$1,000 FOB each, with an activity of 100 curies. At first, the iridium irradiating disks will be imported to be encapsulated at the Energy Research Institute (IPEN). The national consumption of these iridium irradiating capsules is 400 per year.

The president of the Brazilian Nuclear Technology Company, Agnaldo Rocha, has revealed that this product will be available on the market in March or April, 240 capsules will be made available on the internal market, and another 240 capsules will be marketed in Latin America through a contract signed with the British company Amersham International which will distribute the product primarily in Argentina, Bolivia, Colombia, Chile, and Venezuela.

The president of the National Nuclear Energy Commission, Rex Nazare Alves, has revealed that the commission's 1984 budget for research and production is on the order of 35 billion cruzeiros, compared to 20 billion cruzeiros in 1983.

CSO: 5100/2059

ENERGY MINISTER ON NUCLEAR BUDGET, POWER PLANT

PY232011 Rio de Janeiro O GLOBO in Portuguese 20 Jan 84 p 18

[Text] Mining and Energy Minister Cesar Cals said yesterday that the Brazilian nuclear program will have an annual budget of \$850 million as of 1984, a budget which will guarantee that Nuclebras activities under the accord signed with the FRC will be kept in full swing. During an interview granted yesterday at Nuclebras headquarters, Cals reported that this means that Nuclebras' budget, which had previously been fixed at 1.07 trillion cruzeiros, will now have to be raised to 1.2 trillion cruzeiros. Cals revealed that Planning Minister Delfin Neto has approved in principle the new budget, and that only the sources for the funds have to be determined. This way, Nuclebras will be in a position to start the construction of the Angra-II nuclear power plant in December. It will also be able to start the construction of Iguape-I in 1986 and Iguape-II in 1987.

Talking about the importation of 1 million metric tons of Colombian coal, Cals stated that the Colombian coal, which has barely 4 percent ash content, will be mixed with Brazilian coal, which has 50 percent ash content, to be used by the aluminum industry in Carajas.

The Angra-I nuclear power plant was halted a week ago due to problems in the axle linking the two cooling turbines in the so-called "non-nuclear" section. According to Mining and Energy Minister Cesar Cals, the component had corroded, affecting the operation of a bearing [mancal de escora]. The repair work is being carried out by Westinghouse and Furnas [Electrobras subsidiary] technicians with the cooperation of Light, a company which has a technical office. Nuclebras President Dario Gomes has reported that the repair work will be completed in 10 or 15 days and that there is a chance that Nuclep [Nuclebras Nuclear Plant Construction, Inc] may make the replacement parts. Cesar Cals said that these frequent breakdowns will not endanger the plant's operation in the future. Angra-I has already reached 70 percent of its installed capacity, and Cals expects that the 100-percent figure will be reached in 1984.

CSO: 5100/2062

NAVY MINISTER ON NUCLEAR SUBMARINE PROGRAM

PY241130 Rio de Janeiro JORNAL DO BRASIL in Portuguese 22 Jan 84 p 13

[Interview granted to JORNAL DO BRASIL by Navy Minister Admiral
Eduarde da Silva Fonseca Maximiano--place and date not given]

[Text] [Unidentified reporter] Nuclear research and construction of nuclear submarines are two undertakings which, each by itself, require strict quality control. Now, when these two things are put together within a project that should meet military standards, such requirements are as strict as they can be. What preparations are being made by the Navy to meet such requirements?

[Maximiano] We have good experience in naval construction and in remodeling submarines. Furthermore, we will send technicians abroad to specialize in the construction of submarines. At the same time, the project for building nuclear vessels will have foreign supervision, German supervision in this case.

[Reporter] This type of program will require highly skilled manpower -- people holding doctoral degrees from MIT (Massachusetts Institute of Technology) for instance. Do you have this kind of personnel?

[Maximiano] At first, we had a nuclear engineer, and now we have other engineers who were educated in the United States. Some of them hold doctoral degrees from MIT, top-notch people really.

[Reporter] How many, Minister?

[Maximiano] At this moment we have four naval and civil engineers with PhD's. Two of these have only recently joined the project to construct a nuclear submarine, working full time.

[Reporter] According to some estimates, \$3.5-billion is needed to complete such a project, from research on the reactor to the submarine itself. Is this right?

[Maximiano] Not at all. If all that money were needed, we could not even think of such a project. A "Trident" class nuclear submarine of the U.S. navy, with 18,000-tons displacement -- equal to that of our aircraft carrier "Minas Gerais" -- and carrying as many as 24 missiles, costs \$1.8 billion. Initially, our project calls for the construction of some conventional submarines, on the basis of which nuclear submarines will be built later. After all, the only difference will lie in the power system. A conventional submarine now costs approximately \$80 million; therefore, I estimate that the first Brazilian nuclear submarine, which will have a small displacement, will cost just twice as much, no more than \$200 million.

[Reporter] Is it true that the domestic equipment will be partially based on technology from KWU (Kraftwerk Union), a German company which will supply some of the reactors and which will transfer the technology for the production in Brazil of other reactors for generating electricity, within Nuclebras' nuclear program?

[Maximiano] Not the KWU nor anybody else. We are studying, comparing several models we already have here with those available in the international market, until we wind up with our own model. Once this research phase is completed, we will begin construction.

[Reporter] It is said that one of the big problems is to make a compact reactor for a submarine, because the reactor has to be small.

[Maximiano] That is one of them. The main problem is the materials needed for its construction.

[Reporter] You are developing this work at the IPEN [Institute for Nuclear and Energy Research] on the USP [University of Sao Paulo] campus, right?

[Maximiano] We have a group working there to develop the project, but when the time comes to build the reactor, we will do it somewhere else. The prototype might be built there; it involves no danger. We are studying the reactor's characteristics, resolving problems related to resistance of materials so that we may eventually have our own equipment. Everybody should understand that no country will agree to selling that kind of equipment to us. I expect that we will have everything ready in the early 1990's.

[Reporter] As far as we know, you at the Navy are already contracting with an engineering firm that will prepare the installations for that reactor. How far along are you on this phase?

[Maximiano] I do not want to get into details, so as not to create problems for our personnel. I am going to be frank with you: We are not building it yet.

[Reporter] Would that experimental equipment be a power reactor?

[Maximiano] Yes. It would be a research reactor like the one IPEN already has [The minister refers to the IZA-R1 which used 93-percent enriched uranium, and can be at 5MW power. It has functioned with no trouble since 1957, and it is under International Atomic Energy Agency control.]. That reactor will serve as the basis on which the submarine's reactor will ultimately be developed.

[Reporter] We cannot speak of the reactor without speaking of its fuel. According to our calculations, something on the order of 6 kgs of well-enriched uranium-235 will be necessary for the first charge, with the reactor working at zero power. Is that so?

[Maximiano] About that. The uranium needs to be highly enriched.

[Reporter] No doubt. It has to be superenriched. To be more precise, it has to be enriched at least to 70 percent.

[Maximiano] That's right.

[Reporter] Will it be possible to enrich the uranium for the experimental reactor and for those to be installed in submarines at Resende (Nuclebras unit located in the Rio de Janeiro municipality of Resende where uranium is to be enriched through the jet-nozzle method to supply fuel elements for the nuclear electricity plants)?

[Maximiano] Why not?

[Reporter] Because the Resende unit is subject to control by the International Atomic Energy Agency, so the fuel produced there can only be used for supplying our future nuclear plants.

[Maximiano] That's correct. But we cannot link one thing to the other. I do not know if the use of uranium under safeguards will be forbidden. I believe that it will be [as published] although a submarine is a vehicle, not a weapon. I cannot go further on this.

[Reporter] Even so, we believe that still there will be problems, because the countries of the so-called atomic club, such as the United States, Great Britain, and so forth, will not sell any enriched uranium to us. Can we count on the PRC and South Africa?

[Maximiano] We might buy it from either of the two, but we do not intend to find ourselves in that position. We want to manufacture both reactors and fuel because, otherwise, our vulnerability will be very high.

[Reporter] Are the IPEN and the CTA (Sao Jose dos Campos Aerospace Technical Center) the main centers involved in nuclear research work for the submarines?

[Maximiano] The CTA does not participate.

[Reporter] Is that because the CTA is working on uranium enrichment with laser beams?

[Maximiano] The truth is that you cannot go through a single route. The jet-nozzle method is proven only in theory.

[Reporter] Because ultracentrifugation is more reliable, it is another program, it is not?

[Maximiano] Nobody sells those technologies. Each one goes his own way. Let's stop on the question of uranium enrichment.

[Reporter] How long do you believe it will take to master the reactor and uranium enrichment technologies?

[Maximiano] My estimate is by the early 1990's. It is a problem for a future government to decide whether to buy the first fuel charges and so forth abroad. The main thing is knowing how to build submarines.

[Reporter] We will have the reactor, and uranium-235 enriched to 70 percent to fuel it. This is a very valuable material which makes possible the manufacture of atomic bombs of reasonable quality. If enriched to 92 percent, it is possible to build even better atomic bombs, is it not?

[Maximiano] Of course anybody who has all that has the material to build the bomb. That was the case of all countries that now have that weapon. That is happening in Argentina which already has plutonium-239. (Plutonium-239 is a radioactive waste of the fuel elements and it can be reprocessed either into fuel again or used as an ingredient in the so-called "dirty bomb," similar to the atomic bomb dropped on Hiroshima.) Anyone who has nuclear plants ends up one day having all the material necessary for nuclear weapons. That's just the old story: Had Admiral Alvaro Alberto been allowed to go on with his nuclear program, we would be enriching uranium right now. I could see the pressure the Americans exerted against him. So his plans were blocked, and today we have nothing.

[Reporter] We are going to have the byproduct of nuclear research, and we will be in a position to manufacture the bomb in the 1990's. Whenever we reach that point, what will be necessary to build the bomb?

[Maximiano] The decision of a future government. But today I want to make something clear: We, the military, are not going after the bomb.

With the development of nuclear research, however, one day the country will inevitably have the material necessary to build the bomb. And it is a good thing to have that capacity. But just because we possess that capacity, manufacturing the bomb will make no sense because we do not intend to go to war against anyone. Where would we drop the bomb? On our heads? So we should not build any nuclear device.

CSO: 5100/2064

EDITORIAL ON FLAWS AT ANGRA 1 NUCLEAR PLANT

PY241050 Sao Paulo FOLHA DE SAO PAULO in Portuguese 23 Jan 84 p 2

[Editorial: "Nuclear Monument"]

[Text] Mines and Energy Minister Cesar Cals has just announced yet another flaw in the Angra 1 nuclear plant. This time it has to do with premature corrosion in the turbine axle. This is unexplainable because the system has never yet operated at full load, and it is supposed to operate trouble-free for 25 years. It should be recalled that a few years ago FOLHA DA TARDE raised the hypothesis that the one centimeter tilt which the Angra 1 foundations experienced could eventually damage the axle of the turbine which operates the generator, due to the intense mechanical fatigue resulting from the axle's gradual misalignment.

Seven years behind schedule, Angra 1 has already been troubled by a list of defects, ranging from gross errors in the project itself to the invasion of its pipes by barnacles which blocked water circulation through the secondary circuit. This sinister comedy is not the privilege of Angra 1 alone, because a large number of nuclear plants installed abroad, on the basis of the same technology, have similar records of flaws.

In 1975, when Brazil signed the nuclear agreement with the FRG, Great Britain rejected that technology, arguing that it would be impossible to avert premature fatigue of the pipe material through which high-pressure radioactive water at 300 degrees centigrade runs at 100 kmph. The radioactivity of the water in the primary circuit, the British argued, would reduce the malleability of the material of which the pipes are made, accelerating even more the weakening process caused by intense vibrations, resulting from the high temperature and high pressure of the circulating water. According to the British, these combined effects could bring about the premature deterioration of the pipes.

It is therefore most likely that the desperate efforts by the engineers of the Furnas Electrical Company will be in vain, and that the unfortunate experience with Angra 1 will be turned into a monument, not of the victory, but of the failure of the Brazilian nuclear program.

CSO: 5100/2062

BRIEFS

FRG INTEREST IN MINING COMPLEX—Rio de Janeiro—Dario Gomes, president of NUCLEBRAS [Brazilian Nuclear Corporations, Inc], announced yesterday that "the understanding reached at the Ministry of Foreign Affairs for the construction of an industrial-mining complex at the site of the uranium deposit of Lagoa Real (Bahia) is the first major step taken by NUCLEBRAS in keeping with its policy of obtaining its own funds to finance its industrial undertakings, particularly at a time when Brazil is experiencing budget difficulties." In the case of Lagoa Real, Dario Gomes said, a German firm, Urangesellschaft, is interested in the enterprise. Lagoa Real uranium ore is of a quality which places it on a par with the best in the world; and the deposit has high ore content, about 90 percent. The Lagoa Real uranium reserves, estimated up to now at 93,190 tons, ranks second in the country. It is exceeded only by that of Itataia, in Ceara, where a similar contract for the production and presale of uranium concentrate may be negotiated. In view of that type of contract, NUCLEBRAS is guaranteeing to sell the uranium concentrate produced from the two deposits (that of Itataia as well as phosphoric acid) to the financing firms at international market prices. Lagoa Real is presently carrying out projects connected with infrastructure, environmental control and radiological protection. [Text] [Sao Paulo O ESTADO DE SAO PAULO in Portuguese 31 Dec 83 p 21] 8568

URANIUM ENRICHMENT PROJECTION—Belem—NUCLEBRAS President Dario Gomes stated yesterday that at the end of next year the first uranium-enrichment cascade manufactured in the country is to be tested in Resende, Rio de Janeiro State; this will enable Brazil to use the enriched ore in the centrifugal-jet system used in Brazilian nuclear plants. Dario Gomes, a Para native, came to Belem to take part in the general assembly of the Electric Power Plants of Para as a member of the board which is now determining the restructuring of the firm's directorate with the election of two new directors. He did not choose to comment on the 23.1 percent cut in the NUCLEBRAS budget, announced by Minister Cesar Cals, alleging that he did not yet know the organization's official figures for this year. According to him, the budget distribution is expected today or tomorrow. However, he said that if only 1.07 trillion cruzeiros is really allocated instead of the 1.4 trillion requested, it will be necessary to reschedule priorities. As for the occurrence of uranium in the area, Dario Gomes said that the Araguaia River reserves in southern Para are still being investigated. He also said that research is to continue until the completion of those projects and the inclusion of the reserve, whose potential is not yet known, in the exploration phase. [Text] [Rio de Janeiro O GLOBO in Portuguese 29 Dec 83 p 20] 8568

ANGRA I OPERATIONS--Licinio Seabra, president of Furnas Electric Power Plants, Inc, announced that the National Commission for Nuclear Energy (CNEN) has now authorized the full-scale operation of the first Brazilian nuclear power plant, the Angra I. This week Angra I is beginning to function at 75 percent of its capacity and, in January, it is expected to produce 100 percent of the total, that is, 626,000 kw. Because of technical problems discovered at the plant, CNEN had limited Angra I's maximum production capacity to 50 percent. However, in the next few days, the plant will exceed that limit. Licinio Seabra emphasized that all safety aspects are being controlled not only by the plant's technicians but also by CNEN specialists and other organizations of the Federal Government. Next year when it is producing commercially in supplying energy to the Rio de Janeiro area, Angra I will reach its full capacity. Meanwhile, for technical reasons, its average production will be 60 percent. Seabra said that even hydroelectric plants do not operate at 100 percent of their capacity all the time and that this reduction is called "load factor" in technical terms and takes peak demands into consideration. Among the Furnas priorities for 1984, President Licinio Seabra stressed the completion of the transmission lines between Itaipu and the southern part of the country. /Text/ /Rio de Janeiro O GLOBO in Portuguese 27 Dec 83 p 17/ 8568

ADVANCE BAHIA URANIUM SALES--The secretary of mines and energy of Bahia, Paulo Ganem Souto, confirmed yesterday that the government is going to make advance sales of part of the uranium reserves of Lagoa Real in the interior of Bahia to uranium importing countries "so that additional funds may be acquired and it may be possible to develop and establish the projects in that sector." The Lagoa Real, located in the Bahian municipality of Caetite, is the second largest in the country with its 93,000 tons of uranium. It is exceeded only by the Itataia deposit in Ceara, the potential of which is 143,000 tons. [Sao Paulo FOLHA DE SAO PAULO in Portuguese 25 Nov 83 p 12] 8711

CSO: 5100/2039

CORFO TO BEGIN LITHIUM PRODUCTION IN MARCH 1984

Santiago EL MERCURIO in Spanish 12 Dec 83 p C-5

[Excerpts] The project required an investment of \$60 million, CORFO development director, Commander Edgardo Villalobos, reports.

In 3 months Chile is to begin producing lithium at Salar de Atacama, according to an announcement made yesterday by Production Promotion Corporation (CORFO) development director, Commander Edgardo Villalobos.

The project to mine this mineral required an investment of \$60 million and is being developed by the Chilean Lithium Company, constituted by CORFO (45 percent) and the American firm, Foote Minerals, which holds the remaining 55 percent.

It is estimated that Chile's annual production of lithium will amount to about \$20 million.

At the present time the marketable uses of the mineral are in the production of aluminum and batteries, while its future use in nuclear fusion operations is being studied.

Furthermore, the corporation is at present accepting bids for the potassium salts and boric acid project, also at Salar de Atacama, which will cost \$180 million.

The above information was revealed to EL MERCURIO during an interview in which Commander Edgardo Villalobos reported on the development operations executed by the corporation this year and on future prospects.

For 1984 he anticipated the creation of a production development fund with part of the funds the corporation has for research and development. "It is a matter of giving private initiative a chance to get involved in research on the development of new sources of production," he said.

Salar de Atacama

The exploitation of Salar de Atacama constitutes one of the chief development programs CORFO is carrying out.

"There is a sort of soup or brine in the dry salt lake. In it lithium, boron, potassium and other elements cooccur. Therefore, a company can be formed which mines lithium and also at the same site another company, which mines potassium, boric acid, etc. It is essentially a matter of drilling a hole in the ground and then the brine flows out of it, is suctioned up and laid out to dry in solar pools, and then the lithium, potassium, boric acid, etc. is extracted," the executive said.

In the opinion of Commander Villalobos, comparatively speaking the great advantage Chile has in Salar de Atacama, and which makes this project an attractive one, is the fact that intensive use of solar energy is made, representing a great saving.

The executive said that, in addition to the production of aluminum, batteries and medicine in general, lithium will in future serve a very important function in the fusion of nuclear energy, even though the technology is at present just being developed.

He said that there are estimates for the years 2010 and 2020 for possible lithium investments (when nuclear fusion technology is mastered) that would represent a jump in demand of from 1,000 to 2,000 percent. "That is why lithium production in Chile has only been authorized on a small scale; I would say about 10 percent of the estimated reserves, no more than that because it is not a matter of delivering all the lithium, of exhausting our reserves."

11,466

CSO: 5100/2146

BRIEFS

RADIOACTIVE CAPSULE DISAPPEARS—Scientists from the Nuclear Affairs Institute yesterday made a dramatic call to the person who stole a radioactive source of iridium 192, saying that they should take precautions and not expose themselves or others to the deadly risks which could cause serious burns, cancer, amputations, genetic deformities and death. Scientists Ariel Caro, a specialist in radiotherapy and radiophysics, and Ruben Dario Quintero, a chemist from the Radiophysical Health Section which deals with matters related to radioactive protection, hoped that the fateful radioactive capsule has not fallen into the hands of inexperienced people, and that if that has happened, that the person who has it in their possession should refrain from handling it or placing it near person or animals. The radiation extends out for 10 meters around it, and the harmful effects depend on the length of time of indirect or direct contact with the capsule. The capsule was stolen with its respective "shielding," a container which is used to protect the source of radioactive energy when it is not being used. The source itself is a small capsule, approximately 2 centimeters long and 5 millimeters thick, made of steel, in which the solid piece of iridium 192 is placed. The capsule continuously emits gamma rays with a half-life of almost 74 days. In the particular case of the missing capsule, it had an activity of about 50 curies (a unit that measures radioactivity) at the time it was taken. [Excerpts] [Bogota EL TIEMPO in Spanish 26 Nov 83 p 16-A] 8131

CSO: 5100/2043

PERU

13 BILLION SOLES ALLOCATED FOR NUCLEAR PROGRAM

PY101729 Lima Domestic Service in Spanish 1100 GMT 10 Jan 84

[Text] IPEN Chairman General Juan Barrera Delgado has reported that the Peruvian Government has appropriated 13 billion soles for the Peruvian Institute of Nuclear Energy [IPEN] so the institute may proceed with its 1984 nuclear program.

Delgado stated that out of the 13 billion soles, 4 billion soles will be allocated for operational expenses and 9 billion soles used for counterpart funds for projects to be undertaken in the interior of the country.

This is an important announcement showing the Peruvian Government's efforts in utilizing nuclear energy for peaceful purposes.

CSO: 5100/2055

BRIEFS

URANIUM VEIN DISCOVERED — The Peruvian Nuclear Energy Institute (IPEN) has discovered an important uranium vein in the region of Huiquisa in Macusani district, Puno Department. Approximately 500 tons of uranium were discovered, but IPEN specialists believe that the vein could have between 10,000 and 30,000 tons. Since the prospecting work in Macusani is at a standstill, the IPEN's raw materials department has requested approximately \$1 million from the treasury to carry out the preliminary phase of the Huiquisa project. [Summary] [Lima EL COMERCIO in Spanish 20 Dec 83 p A 1 PY]

NUCLEAR REACTOR UNDER CONSTRUCTION—Trujillo, 11 Dec 83—Modesto Montoya, director of the Higher Center of Nuclear Studies of Peru [CSENP], announced that the country will soon have the most powerful reactor in South America, having invested in its construction \$100 million to date. He explained that its construction is 90 percent completed, and that the biggest outlays were made in previous years. The reactor is being set up in a complex located 35 kilometers from Lima. It will facilitate the solution of many problems, but its use for the production of energy is ruled out, he said. For the time being, the purpose is to carry out research that will permit the solution of national problems in the realms of agriculture, industry, medicine, and so forth. Montoya also disclosed that the CSENP is taking full advantage of the aid of international organizations because the state appropriation for research programs is small. [Text] [Lima EL COMERCIO in Spanish 13 Dec 83 p A-14] 8414

CSO: 5100/2051

NUCLEAR ENERGY MEETING OPENS IN CARACAS

PA101645 Madrid EFE in Spanish 2351 GMT 9 Jan 84

[Text] Caracas, 9 Jan (EFE) -- Venezuelan President Luis Herrera Campins today opened the eighth meeting of the Inter-American Nuclear Energy Commission (IANEC) in this capital.

In his address, the Venezuelan president exhorted the delegates to extensively analyze the pressing problem of the use of nuclear energy for purposes of war and stressed that all the peoples of the world are concerned, and rightfully so, over the possibility of a world conflagration.

The director of the International Atomic Energy Organization (IAEA), Hans Blix, said that the whole world associates nuclear energy with the atomic bomb. "However," he added, "it would be absurd for this to become such an obsession that we forget the enormous benefits that nuclear energy offers," such as the production of electricity, a basic element in development.

He emphasized the need to keep a close watch on the use of nuclear energy for peaceful purposes, because "any carelessness here is dangerous and irresponsible and could make people skeptical about the application of nuclear energy."

In the case of the Andean area, he explained that the IAEA is interested in including these countries in development programs on the use of nuclear energy for peaceful purposes.

The meeting, scheduled to last a week, will analyze nuclear problems, advances in peaceful uses, and the threat to mankind represented by increased use of nuclear energy for military purposes.

CSO: 5100/2056

GANDHI, HOUSE DISCUSS NUCLEAR POWER PROGRAM

New Delhi PATRIOT in English 15 Dec 83 p 5

[Text]

Prime Minister Indira Gandhi told the Lok Sabha on Wednesday that India has developed its own indigenous fuel for the fast breeder test reactor, reports PTI.

Therefore, it is not necessary to get fuel from France, she said.

Replying to a question, Mrs Gandhi said a delegation is now in the USSR to ascertain details of that country's offer to set up a man-made atomic power generator in India.

Replying to some other questions, Minister of State for Science and Technology Shri Raj V Pillai told the House that the nuclear power programme being drawn up aims at an installed capacity of 10,000 MWE by 2000 AD and also for the new atomic power stations are yet to be decided.

He said apart from the actual maintenance/retrofitting outages (interruptions), the outages in respect of the Tarapur and Rajasthan atomic power stations were mainly due to grid problems and equipment malfunctioning. Necessary steps were taken to further improve their performance.

Mr Pillai said of the two units being set up at Kalpakkam, Tamil Nadu, the first had been commissioned and was being test run.

The unit was yet to start a stable load operation. He also said the first unit, which had a rated capacity of 200 MWE gross, had been operated at a power level of 200 MWE so far.

Mr Pillai said that about 12,000 tonnes of uranium reserves in form of U₃O₈ has been discovered, which are considered adequate for the nuclear power programme presently envisaged.

The public sector Uranium Corporation of India Limited was engaged in the mining and milling of uranium ore and was currently producing uranium concentrates at Jaduguda in Bihar, he said.

The names of States where uranium deposits were found are: Andhra Pradesh, Assam, Bihar, Chhattisgarh, Jammu and Kashmir, Karnataka, Madhya Pradesh, Maharashtra, Rajasthan, Sikkim and Uttar Pradesh.

Mr Pillai said there has been a loss of about five weeks production of heavy water in the Durgam plant recently as a result of shut down for attending to leakages and leak testing between 9 and 20 October and from 20 October to 20 November this year. It was restarted on 21 November and production commenced from 24 November.

CSO: 5100/7037

PLANS TO SET UP THREE URANIUM MINES TOLD

Calcutta THE STATESMAN in English 17 Dec 63 p 7

[Text]

JAMSHEDPUR, Dec. 16.—The production of uranium in the country will increase threefold over the next six years with the setting up of three new uranium mines in Singhbhum district of Bihar.

The Uranium Corporation of India, a public sector enterprise under the Atomic Energy Department, which is engaged in the mining and processing of uranium at Jaduguda, 60 km from here for the past 15 years, has decided on the three projects, which are located within a radius of 20 km from Jaduguda.

Estimated to cost nearly Rs 50 crores, the first of the three new mines projects at Bhadin will be commissioned by 1968 and the Tarasahi and Harna Pahar mines will begin production by 1969-70, according to Mr H. K. Bhatia, chairman and managing director of the Uranium Corporation of India.

Though the current production of uranium from Jaduguda mines is sufficient to keep the atomic power houses at Kota, Kalpakkam and the one coming up at Narora in Uttar Pradesh running. The increased uranium production will also meet the future requirement

The atomic minerals division has been successful in exploring uranium deposits in many parts of the country but the deposits in the "Singhbhum thrust belt" are huge, though of an inferior grade. The uranium ore in Jaduguda, which is the only source of nuclear fuel in the country, contains only 600 grams of uranium a ton. The deposits in the new mines projects are still more inferior to that of Jaduguda.

Mr Bhatia said the processing of uranium from the ore would not be a problem because India had acquired expertise and technical know-how over the years in handling inferior ores. The new projects would use improved technology, Mr Bhatia added.

The Uranium Corporation has entered into an agreement with an Indian firm for providing consultancy, including foreign consultancy, in a limited way. The corporation will not directly collaborate with any foreign firm for security reasons though some equipment for the mines will be imported through some Indian firms.

The Hindustan Copper is already processing uranium from copper waste. One more pilot plant has been set up at Bhadrachalam and its commercial viability is being studied.

CSO: 5100/7038

AEC CHAIRMAN STUDIES SOVIET NUCLEAR POWER OFFER

New Delhi PATRIOT in English 19 Dec 83 p 3

[Text] MOSCOW, Dec 18 (PTI)—The Soviet atomic power station offer has become technologically too important to be taken lightly by India but it is still premature to say if and when it will go through, according to knowledgeable sources here.

For the week-long talks Chairman of the Atomic Energy Commission Dr Raja Ramanna has had in Moscow with Soviet Economic, energy and scientific authorities were preliminary and exploratory in nature, the sources said.

With no mandate to take a decision on the offer, Dr Ramanna devoted himself largely to a study of the pros and cons of India going in for a new fuel-moderator system for generating atomic power.

He raised many questions, received replies to several of them, and has to provide data required for answers to the other points in his questionnaire.

Costs are something that Soviets can discuss if they are told of the location India has in mind, but it is a political question for India, and it is too early to decide—especially with elections due in a year's time.

Another decision India must take is whether it would send natural uranium for enrichment in the Soviet Union or buy enriched uranium from the Soviets. This decision itself is contingent on whether India would wish to reprocess the spent fuel itself or return it to the Soviet Union which had adequate reprocessing facilities.

Dr Ramanna, left for home yesterday and would submit his report to Prime Minister Indira Gandhi, who also holds the charge of Atomic Energy.

CSO: 5100/7039

BRIEFS

ATOMIC BOMB AID TO PAKISTAN--New Delhi, 17 (AFP)--A visiting Chinese official today denied that China was helping Pakistan make an atomic bomb as reported by the local press recently. "It is just a rumour that China is supplying equipment and assistance to Pakistan to make an atomic bomb," Kin Lin, vice president of the Chinese People's Association for Friendship with Foreign Countries (CPAFFC) told reporters in Calcutta, the TELEGRAPH newspaper reported today. He said India and Pakistan were neighbours and it was not China's intention to set one against the other. Mr Lin, leader of a five-member delegation visiting India, also said China wanted the Indo-Chinese border dispute solved on "a reasonable and fair manner in an amicable atmosphere." On the Taiwan issue, Mr Lin said the United States should accept Taiwan as part of China. Regarding ties with the Soviet Union, he said China as a neighbour was interested in improving its ties with that country. "But the USSR must withdraw its forces from Afghanistan and also its one million soldiers deployed along the Sino-Russian border," he said. [Text] [BK171418 Hong Kong AFP in English 1411 GMT 17 Jan 84]

OFFICIAL DISCUSSES NUCLEAR REQUIREMENTS--Several measures have been taken to meet the heavy water requirements of nuclear plants in the country. This was stated by the chairman of the Atomic Energy Commission, Dr Jaja Rammana, while delivering a lecture on energy from atom arranged by the India International Center in New Delhi. He said the measures include increased production of heavy water and application of its substitutes. Dr Rammana expressed satisfaction at the working of various plants. Later, talking to newsmen, he said India has asked the United States to honor its obligation under the contract and supply all the spare parts required for the Tarapur plant. [Text] [BK140718 Delhi Domestic Service in English 0240 GMT 14 Jan 84]

TARAPUR NOT TO SHUT DOWN--The chairman of the Atomic Energy Commission has said that the Tarapur atomic power station will not be forced to shut down in case of nonavailability of enriched uranium fuel from abroad. Dr Raja Ramanna said the station can run with the mixed oxide fuel developed by Indian scientists. He was delivering a lecture on nuclear power--its social and economic implications--in New Delhi organized by the India International Center. [Text] [BK160316 Delhi Domestic Service in English 0240 GMT 16 Jan 84]

TARAPUR POWER OUTPUT--BARODA, Dec. 4.--The Tarapur atomic power unit No 1, which started generating 60 MW of power from December 1, has gradually increased its generation to 120 MW, according to a spokesman of the Gujarat Electricity Board, reports PTI. Gujarat and Maharashtra get an equal share of power from this unit. [Text] [Calcutta THE STATESMAN in English 5 Dec 83 p 1]

CSO: 5100/7036

SOUTH AFRICA

BRIEFS

NUCLEAR WASTE STORAGE--The executive chairman of the Atomic Energy Corporation, Dr (Wynand de Villiers), says that with available technology high level waste produced by the Koeberg nuclear power station on the Cape west coast can be safely stored so that future generations may have no concern about it. Speaking in Cape Town, he said that during its life span of about 30 years, Koeberg would produce between 100 and 200 cubic meters of nuclear waste, which would easily fit into a large room. [Text] [MB150645 Johannesburg Domestic Service in English 0500 GMT 15 Jan 84]

CSO: 5100/15

NUCLEAR RESEARCH INSTITUTE: URANIUM MINING IS FEASIBLE

Copenhagen AKTUELT in Danish 16 Dec 83 p 18

[Article by Nina Hansen: "It Can Pay to Mine Greenland Uranium"]

[Text] It is economically profitable to mine uranium at Kvanefjeldet [Kvane Hill] in South Greenland, although the ore contains far less uranium than other places in the world, a report from the Risø Research Station maintains.

In 15 years it will be possible to mine uranium corresponding to at least 15 billion kroner in 1983 prices.

A Greenland mining operation will provide employment for 600 people, but only 60 of the new jobs can be filled with Greenland manpower in the first few years, the report says.

When uranium-containing ore is mined, it is impossible to avoid at the same time mining some ore which does not contain uranium. In Greenland it is a question of 1.4 tons of ore each time one ton of uranium-containing ore is mined. And then only 365 grams of pure uranium are gotten from this ton of ore.

The ore at Kvanefjeldet contains less uranium than other places in the world. But Risø has developed a technique so that it can pay to mine it anyway. Also because less non-uranium-containing ore is mined at Kvanefjeldet than other places. This reduces operating costs.

It will be necessary to expand the town of Narssaq, which Kvanefjeldet is in the vicinity of, if a mining operation is established. About 1400 people will move to the town.

In addition there is a need for more shops, institutions and spare-time activities, Risø says, which has still not been able to give a final estimate of how the mining operation will affect the environment.

8985

CSO: 5100/2532

POLL FINDS THAT THREE IN FOUR OPPOSED TO NEW NUCLEAR PLANTS

Helsinki HUFVUDSTADSBLADET in Swedish 20 Dec 83 p 7

[Text] An overwhelming majority of Finns, 77 percent, are opposed to the building of a fifth nuclear power plant in Finland. Only 18 percent support the expansion of nuclear power.

This came from an opinion poll which the statistical center has made for TV news. Five percent of the total of about 1,200 polled had no opinion.

According to the poll women are more opposed to nuclear power than men. Also, incomes separate the opponents from the supporters of nuclear power. Among those whose incomes are below 4,500 marks per month, the percentage of opponents is significantly higher than among those earning higher incomes.

The main reasons why the opponents do not want more nuclear power plants are that they are worried about safety and waste problems, they believe that no more electricity is needed and that more alternative energy sources should be developed.

Supporters of nuclear power believe, on the other hand, that the main reason for building more nuclear power plants is that more electricity is needed. Other reasons are cheap electricity and the lack of damage by nuclear power on the environment.

9287

CSO: 5100/2533

FINLAND

IVO ESTABLISHES SEPARATE FIRM TO SERVICE NUCLEAR PLANTS

Helsinki HELSINGIN SANOMAT in Finnish 10 Dec 83 p 36

[Text] The large and powerful Imatran Voima, (IVO) has formed a special company called IVO Service, which will offer to power plants, to industry and energy/electricity-generating stations services in maintenance, repair and modification.

This is nothing really new for the firm, because these kinds of services have been on the market now for some ten years. Now, however, they are being concentrated into a subordinate unit of the affiliated company IVO Consulting Engineers Co, which sells professional advice.

The establishment of a firm selling maintenance and repair services is a natural consequence of change in the energy field. Relatively few power plants and electrical systems are being built any more, but the old ones have to be kept in good working order and brought up to date. IVO has done just exactly that by, among other things, modifying its own coal power plants in Naantali and Vanaja to also produce district heating, and by converting from oil to coal at the Lahti Kymijarvi power plant.

IVO Service uses the designers and technical expertise of the parent company and does not intend to hire its own separate staff. The new service-oriented firm expects to do about 4 billion marks worth of business next year. Contracts have already been drawn up for the yearly maintenance of six or seven domestic power plants. In the initial stage the firm is concentrating on domestic markets, but later on it will try to sell its services abroad, especially in Sweden.

The heretical doubts about the establishment of a new firm to provide work for IVO's 800 designers struck Pertti Voutilainen, a member of IVO's board of directors, as unwarranted. Just in connection with current projects there is enough work for hundreds of designers, and as a matter of fact the company is even going to have to add new people to the designing/planning staff, according to Voutilainen.

The yearly contribution of roughly 100 million marks for research and development will keep the IVO designers so busy that the preparatory work

for the new main office, for example, will have to be given to outsiders. The planning for the company's hoped-for fifth nuclear power plant, however, is only requiring the efforts of about twenty persons at the present moment, according to Voutilainen.

--The share capital of Scan-Auto Ab is being increased by 11 million marks to 70 million marks. The company's two shareholders, Valmet Co, and Saab-Scania Ab, each of which owns 50 percent of the company's shares, have both subscribed for half of the new shares.

12327

CSO: 5100/2535

PASOK-SPONSORED LAW JEOPARDIZES DIMOKRITOS FACILITY

Athens I KATHIMERINI in Greek 3 Dec 83 pp 1, 3

[Text] Despite the officially expressed complete opposition of all transmitters of research, scientific societies, and political parties (with the exception of PASOK), Minister G. Lianis is pressing forward the legislative bill on scientific research and technology.

At a special general meeting the researchers of "Dimokritos," which the legislative bill breaks up, decided to actively oppose it as they report in a resolution which they presented to the president of Greece, the prime minister, the appropriate ministers, and party leaders. Mr K. Karamanlis was the founder of the Nuclear Research Center [KPE] "Dimokritos."

In the protest resolution the scientists who serve at "Dimokritos" charge as follows:

We, the scientists of KPE "Dimokritos," who are among the primary transmitters of research in the applied sciences in Greece, denounce the new legislation which places Greek scientists and Greek science under persecution. The EED [expansion unknown] considers the legislation for developing scientific research and technology unacceptable because:

1. It concentrates in the person of the minister of research and technology great amounts of power for establishing, abolishing, and breaking up the research centers and institutes.
2. It denies self-administration to mature scientists with high formal and authentic qualifications. It does not provide for those working to participate in drawing up internal regulations.
3. It essentially abolishes the Greek Atomic Energy Committee which has international importance and connections. It abolishes KPE "Dimokritos" and replaces it with EKEFE [expansion unknown] "D," which will dry up with the removal of many activities and the establishment of restrictions for these activities' Institute. Thus the Center's multi-membered aspect is abolished and the degree of cooperation and scientific efficiency is reduced. The change of the legal status quo deprives personnel of the possibility of joining in collective agreements for demanding their fundamental rights and strips them of the legislative protection guaranteed by the Constitution.

4. It is governed by angry enmity against researchers since: a) It reduces their individuality. b) It dismisses them from regular positions, ignoring the previous judgments about ranking and promotion. c) After long previous service it removes their ranks and subjects them to a new ranking process. d) In case the researcher is not placed in the grades provided, he is reduced to nothing (he is humiliated morally, professionally, economically, and even discharged).

e) It divides the scientists of the Research Centers into two categories, researchers and functionaries. The second category is confronted by the legislation as a subordinate group of scientists where the incapable or nonproductive researchers end up who cannot be placed in grades A, B, C, or D. For the functionary scientists no professional and salary development is provided corresponding to that of the researchers.

5. It reduces the participation of KPE "D" in postgraduate studies. For the above reasons we demand that the bill not be introduced into the Chamber of Deputies, but that it be revised with substantial participation on the part of the Collective Organizations of Scientists.

We declare that we will fight with every means at our disposal to keep the proposed legislation from becoming a law of the state.

11587

CSO: 5100/2531

JOURNALIST ON SOVIET NUCLEAR THREAT TO SPAIN

Madrid ABC in Spanish 3 Dec 83 p 26

[Article by Carlos Alberto Montaner: "Missiles against Spain--The Soviet Logic"]

[Excerpts] It is pathetic that the government in Madrid is surprised that the Soviet missiles are aimed at Spanish targets "when everybody knows that there are no Yankee missiles aimed at the USSR from Spanish soil."

Who could have told Felipe Gonzalez that Soviet military doctrine allows for these subtle reciprocities? With or without rockets, with United States bases or without United States bases, Spain is a preferred target of the Soviets in case of a nuclear war because of its geographic location and especially because of the fact that it is an industrial and agricultural country with a certain standing, constituting a part of the enemy economic circuit.

In case of conflict, Spain will be directly attacked by the Soviets by virtue of an inexorable line of reasoning which applies both in Moscow and in Washington: Nobody can win the war. What can be won is the postwar period. After frightful destruction--and this is painful to say--the "winner" will be the side that manages to get back on its feet faster and to bury the dead.

This is why Spain will be devastated. Moscow cannot leave intact the world's 11th-ranking industrial country, a producer of arms, a planter of crops, a fisher and miner. In the frozen eyes of the Soviet Strangelove, Spain is a complex that is entirely too important not to be smashed to pieces.

Well, now: What can be done in the face of this real threat? Arming oneself is a worthwhile possibility. It is a good idea to let the Soviet know that destroying Madrid or Barcelona can bring about equivalent destruction of Moscow or Leningrad. This is the logic of Great Britain, France, and Israel. But disarming oneself also makes sense: There is some validity in hoping to get from the USSR only the indispensable lethal dose, without annihilation, without atomic saturation, without "overkilling," even though this may happen only because Spanish targets turn out to be secondary.

All of this, in the final analysis, is debatable; but there is a third way which is absolutely unquestionable and on which the "doves" and "hawks" can

immediately agree while they discuss the sex of the missiles: In advance, organizing civil defense and developing a crash program of rescue and atomic shelter construction plans. If Spain cannot do anything to escape atomic bombardment, it can, on the other hand, concentrate its entire effort on diminishing the effects of that bombardment, saving the largest number of persons possible and preparing itself to keep a minimum infrastructure going, a structure capable of functioning in the midst of the worst chaos imaginable.

This precisely is the strategy of Switzerland and the State of Israel. The Swiss are sufficiently realistic to realize that there will be no winners in the Third War. They will not be able to avoid it, nor will Israel be able to prevent the country's destruction; but countries can rebuild themselves if people are left alive and, in the final analysis, the important thing is not the "civitas" [community of citizens] but rather civilization. A strong instinct for survival persuaded the Swiss and the Israelis to build a shelter, a hole, a place for each of their citizens. Of course, if the war should break out, Swiss and Israeli casualties will be tremendous but they will be proportionally less than those of the other countries.

The Spanish state, which has never been characterized as foresighted, now has an opportunity—and, who knows whether this is the last one—to act in a mature and responsible manner, turning civil defense into one of the administration's priority objectives. There is no doubt that all of this is enormously expensive but the Spaniards are ready to pay for atomic shelters, underground hospitals, and individual equipment against radioactivity, rather than paying the bill for the 84 brand-new F-16 aircraft.

Nobody can be sure whether or not there will be a war. Common sense indicates that the superpowers are not prepared to immolate themselves in a senseless butchery but the history of war of the human race suggests that common sense is not precisely the most frequent virtue among the political leadership. The existence of Hitler or Mussolini, in the past, of Khomeyni and the Iraqi Hussein in the present, of Castro and Qadhafi has demonstrated to us for many years that there are sufficient crazy people near the planet's most dangerous powder kegs. And in the face of lunatics, as in the face of bullets, when the course of action is decided, the only wise thing to do is to go into hiding.

5058

CSO: 5100/2530

STUDY OF VANDELLOS II CONSTRUCTION IN TARRAGONA

Madrid LUZ Y FUERZA in Spanish Sep-Oct 83 pp 5-11

[Article: "Vandellos II, Tarragona's Fourth Nuclear Powerplant"]

[Text] In 1977, the pertinent contracts were signed with the Westinghouse and Bazan suppliers for the construction of the second Vandellos powerplant, adjoining the one currently in production, Vandellos I; however, the final authorization for its construction was not published in the Official State Bulletin until 3-1-81, continuing an inveterate and damaging custom in electrical construction wherein time runs short or, as the head of the Spanish Atomic Forum stated on that occasion, "we are downgrading a factor that is of extreme importance in the energy field: time."

The Vandellos II powerplant, the fourth nuclear powerplant in Tarragona, built by the Vandellos Nuclear Association, consisting of the four large Catalanian electric companies, in which ENHER [Ribagorça National Hydroelectric Enterprise] has a 54 percent share, Hydroelectric of Catalonia has a 28 percent share, Segre Electric Power has a 10 percent share and Electric Power of Catalonia has an 8 percent share, will have a 982 MW pressurized water reactor of the same type as those installed in Asco, Almaraz and Lemoniz, with a production of about 6 billion kWh per year.

The engineering is being provided by an association of firms comprised of Auxies and Bechtel Power Co, with an investment volume difficult to establish, because it has increased considerably with the passage of time. This investment is broken down into 12 percent for engineering and management, 25 percent for the turboalternator, 25 percent for civil construction, 30 percent for materials, assembly and equipment, and 8 percent reserved for the fuel load. Actually, in discussing investments planned for the construction of a nuclear powerplant in Spain, only so much of a percentage can be specified for individual jobs and not the final amount, which is unpredictable owing to a series of imponderable factors.

It may also be specified that somewhat over 150,000 cubic meters of concrete, 70 kilometers of piping and 1,000 kilometers of cables will be required, in addition to the equipment, of quite variegated and different origin. The weight of the containment building, including the equipment, will be about 65,000 metric tons, a weight very similar to that of a large modern aircraft carrier.

In another report published in this same issue of LUZ Y FUERZA, regarding the Catalanian contribution to the great Spanish nuclear endeavor, we assigned Catalonia's nuclear effort to a prominent position, although it is merely meeting the need for self-sufficiency in electric power that the area requires. But it is fitting to stress Catalonia's nuclear contributions, of which there are two facilities in service and one awaiting power generation, with the important addition of the Vandellos II nuclear facility, which concerns us particularly now. This is because the contribution from Vandellos II is critical to Catalonia's energy development and hence that of Spain, and because Vandellos II, under construction since 1977, as we have noted, and with final authorization in the Official State Bulletin in 1981, represents the latest contribution from Catalonia to the Spanish nuclear program, at the moment; a program which should also have another Catalanian nuclear powerplant if the prior authorization for the construction of Vandellos is ever confirmed as final.

In 1978, the nuclear program planned for 1990 an installed nuclear power of 12,546 MW, admitting in the hypotheses justifying this plan the fact that the demand for electricity was more moderate than recorded during the years prior to 1975. And this installed nuclear power in 1990 entailed the need to start three powerplants in addition to those stipulated as necessary in the 1978-87 National Energy Plan [PEN].

In fact, in the 1978-87 PEN, based on the studies conducted and the hypotheses established, it was anticipated that the power in commercial service by the end of the period covered by the plan, that is, in 1987, would reach about 10,500 MW; which entailed entry into commercial service by at least three additional groups which, with the power in service (995 MW) and that under construction (6,555 MW), from Almaraz (Groups I and II), Asco (Groups I and II), Lemoniz (Groups I and II) and Cofrentes, would total the aforementioned minimal figure. Hence, PEN planned three other "additional" groups, always seeing to it, as noted in PEN, that "the constant monitoring and reassessment of the real changes in demand would make it possible to gear the construction rate to the real needs." We must associate with this statement in PEN the official authorization for construction of Vandellos II, 4 years after the projects were begun as a result of prior official authorization.

The real status of Spain's demand for electricity is again showing positive signs. Thus far this year, one notes a clearcut trend toward an increase in the indexes on Spanish demand for electricity, as reflected in the data on production and consumption of electrical power prepared on a weekly and monthly basis by UNESA. The latest report we have is for the month of September, during which month the variation in consumption was 4.71 more, with the same trend toward a positive direction in the monthly indexes. Most likely at the year's end the increase in demand for 1983 will show an increment of over 6 percent in comparison with 1982. But, in particular, if we trust that Spain's economic activity will recover and we shall again have the indexes that the country had during the 1960's, more or less, there is no doubt that we shall have to admit that PEN's considerations which we have noted before advise not limiting the effort that have started and are under way for the nuclear

option. We must not forget that the nuclear powerplants help to free our external balance from enslavement to oil, which is obviously destructive.

The site of the Vandellos II nuclear powerplant, like that of Vandellos I, is located on the Mediterranean shore in the province of Tarragona, 40 kilometers from the capital of Tarragona, in a direction south of the one opened in 1972, owned by Hispano-Franco Nuclear. This Vandellos II plant is totally Catalanian-owned, as we have observed, and is being built by the area's four major electrical firms.

Vandellos II will have a PWR pressure light water reactor similar to those built at Almaraz, Asco and Lemoniz, which will use 2,785 Mwt enriched uranium as fuel, and a generator set with an approximate power of MWe. (Vandellos I uses natural uranium.) The Vandellos II powerplant offers an extensive view of a group of buildings wherein a main building with a wide dome about 40 meters in diameter dominates the rest of the structures.

This high prominent structure is known as the containment building, which houses the reactor and its cooling system. The containment building provides the biological shield during the normal operation and constitutes a barrier for the external missiles after an accident.

(It is important to note, incidentally, that the Vandellos II Nuclear Powerplant, like Asco I and Asco II, will benefit Tarragona with an electrical rate of about 800 million pesetas, at least, whereby the income from the Tarragona electrical rate will far exceed 2 billion pesetas per year for the three nuclear powerplants built in the province.)

The second prominent building in the Vandellos II nuclear complex is the so-called auxiliary and control building of the powerplant. This building consists of two sections: one, the auxiliary part of the building, which houses mechanical and electrical equipment required for stopping the reactor without risk, and also provides a biological shield around radioactive equipment, both for the operating personnel and for maintenance. The other control section of the building houses electrical and control systems, including the systems necessary for backup that are directly related to the powerplant's safety. From a functional standpoint, the essential elements are the control room, the upper and lower cable rooms, the room for electrical apparatus and batteries and the air conditioning equipment, related to the safety of the powerplant.

The third building is the one for fuel, containing the facilities needed to handle and store new and irradiated fuel, as well as a reinforced concrete pool for storing the irradiated fuel underwater, and another for wet storage of the new fuel.

The fourth building at Vandellos II is the one for diesel generators, identical to and separate from one another, for reserve electric power, in order to supply certain equipment in case of emergency.

The fifth building is the one for the turbine, which houses the turbine, the generator, the condensers, the condenser system and the water supply, as well as the pertinent electrical and mechanical equipment. Inside this building there is also all the auxiliary equipment, such as compressors, demineralizers, etc., and the necessary cable ducts and pipes.

And, finally, the radioactive waste building houses the systems used to treat the liquid, solid and gaseous radioactive waste generated in the powerplant.

Actually, at present the Vandellos nuclear plant will represent, for the time being, the final point in serving the purpose that the generation of electricity has for Catalonia, while for some years Vandellos III will be merely a project that will not reach the work stage for the present. But the most serious concern of the electrical firms of Catalonia is whether the Vandellos II powerplant, which is in an advanced stage of construction and is another joint endeavor undertaken by the four major Catalanian electrical firms, will be doomed to stop at the government's decision. Despite the fact that its construction started in 1977 with prior authorization, and continued with greater effort and haste in 1981, when in January of the latter year there was actual definitive authorization for its construction, published in the Office State Bulletin, it will now be postponed indefinitely, at the mercy of time which will damage and destroy what the Catalanian people have built with full confidence in the state's guarantee and in the unquestionable need for it to be an essential project to meet the future demand for electricity in Catalonia.

We should not overlook the fact that the stoppage of the work on Vandellos II, like that on Valdecaballeros and Trillo, in an advanced stage of construction, would mean a serious and unjust economic penalty for the companies that have undertaken them; the loss of major technology that is now Spanish; a drain of 40,000 jobs lost; an economic setback for the capital goods sector; and, in particular, the strangulation of the economic recovery, in the event that it should begin, as the government desires, just because of an insufficient supply of national electric power.

2909

CSO: 5100/2536

CATALONIAN CONTRIBUTION TO NUCLEAR ENERGY PROGRAM

Madrid LUZ Y FUERZA in Spanish Sep-Oct 83 pp 13-21

[Article: "Catalonian's Contribution to the Great Spanish Nuclear Effort"]

[Text] At the present time, Catalonia is one of the electrical areas with the largest demand for energy, ranking second after the east-central area in 1982, as a result of its high degree of industrialization, and also the high standard of living enjoyed by Catalonians. For this reason, the autonomous northeast region of Spain has four large electric companies, two of which, namely, FECSA [Electric Power of Catalonia, Inc] and ENHER [Ribagorza National Hydroelectric Enterprise], are particularly prominent in comparison with the dimensions attained by Spain's major electric companies. And in Catalonia itself, in the words of the president and general director of Electric Power of Catalonia, the largest company in the area and the fifth-ranking national firm in the sector, it has been possible to state, with grounds, that "the electrical sector is the only one capable of making a partial substitution of oil with nuclear power over the next 15 or 20 years" (a statement made by Juan Alegre Marcet in 1979, when he was also president of United Electric, Inc [UNESA]).

In fact, the impressive effort expended by firms in the electrical sector, which started many years before the National Energy Plan [PEN] was formulated, had proven the capacity of these companies to make the "partial substitution of oil" with nuclear power, upon the completion of the three leading nuclear powerplants build in Spain and the formation of a genuine technical team of individuals totally equipped for the nuclear field, started before 1960 and improved to fulfill the commitment for accomplishing the nuclear option in Spain.

Catalonia was not dissociated from this effort, and can boast that the third, in order of time, of the first threenuclear powerplants connected to the system in Spain was built in Catalonia, at Vandellos, in Tarragona Province, adjoining the sea, with the largest installed power of the three nuclear electric powerplants constructed in Spain about 1970. Vandellos, which would later be Vandellos I, in view of the subsequent initiatives resulting in the consecutive construction of Vandellos II and the plan for Vandellos III, not yet finally authorized, started contributing kilowatts to the national system on 6 May 1972.

The Nuclear Plants Are Profitable

Ahead of Vandellos, in 1968 there had been connected to the system the Jose Cabrera Nuclear Powerplant, in Zorita (Gaudalajara), belonging to Electric Union, and in 1971, the Santa Maria de Garona Nuclear Powerplant, in Burgos, built by Nuclenor, consisting of 50 percent Iberduero and 50 percent Electra de Viesgo. And it must be said that, since their activity began, these three powerplants, Zorita, Garona and Vandellos, have satisfactorily fulfilled the plans and, except for incidents that are inevitable on projects of this kind, they have discharged into the national system over 90 billion kilowatt-hours since 1969. The companies which built them are quite satisfied with the results of their efforts in the nuclear direction.

Hence, Catalonia has had a nuclear powerplant since 1972 and, this year, 10 years and a few months later, it has another new powerplant, Asco I, with twice the power of the previous one, that is already discharging kilowatt-hours into the electrical system. In fact, by this current date electricity should be generated by Asco II as well, which during its construction period, like Asco I and all the Spanish nuclear powerplants, has undergone countless vicissitudes, without a foreseeable end for the other nuclear powerplants under construction. It has proven impossible to meet the proper date, and overdue date for Lemoniz I and Lemoniz II which, after the enormous investment that they have represented, remain necessarily shut down and unused, for reasons not attributable to the Iberduero firm which built them.

This situation of delays and incertainties, by no means ascribable to the companies in the sector, uncertainties and delays that still persist and are worsening every day, has caused very serious harm to the companies, which are coping with the situation as best they can, and courageously putting up with the constant announcements of changes in the PEN, and the continued official and unofficial statements running counter to the provisions on the same level that have prompted the sector to make the colossal investments entailing the serious, solvent implementation of a nuclear construction plan undertaken with the presumed guarantee of the Official State Bulletin.

Catalonia has precisely joined completely in the nuclear plan as a pioneer, with Vandellos I, and as an enthusiastic perpetuator, with Asco I, Asco II, Vandellos II and the plan for Vandellos III, which does not have government authorization yet. Electricity is being generated by these four new powerplants. Asco II is in the process of generating it and Vandellos II, with government authorization for its construction published in the Official State Bulletin of 3 January 1981, will go into service during the 1980's, if it actually obtains the go-ahead for completing its construction.

Hence, the Catalan electric area currently has two nuclear powerplants generating and a third with imminent entry into service. As we have noted, the first in order of time was Vandellos I. This powerplant, which has given an excellent performance during the 12 years that it has been producing electricity, has a power of 500 MW, and was the result of international cooperation which materialized in the establishment of the Hispano-Franco Nuclear

Power Co, Inc (HIFRENSA), with the participation of the four large Catalanian electric companies, FECSA, ENHER, HECSA and SEGRE, 75 percent of the power-plant and its electric production being owned by the four.

The French state firm, Electricity of France (EDF), is participating, with the remaining 25 percent of the capital, and hence benefits from 25 percent of the production. Vandellos I generates about 3.5 billion kWh per year and, since going into service, will have discharged about 40 billion kWh into the system, 25 percent of which has been sent to France through the Vich interconnection in the Pyrenees, primarily. Therefore, by virtue of the corporation agreement with IFRENSA, EDF is receiving over 800 million kWh per year, generated by Vandellos I.

Self-Sufficiency

It is now fitting to consider Catalonia's electrical status in the general electrical context of the peninsula; because the regional interconnections afford a constant flow of kilowatts from one electrical area to another, based on the needs of each, which vary according to the demand and according to the feasibility of having one powerplant or another generate electricity, as well as on the basis of the power supplies of the peninsula's electrical complex as a whole.

Catalonia's electrical status in the context of the peninsula's interconnections between electrical areas had a deficit up until 1982, a status that began changing in 1983, with the entry into service of the Asco I Nuclear Powerplant. In 1982, the electric power generated in the Catalanian area amounted to 18.119 billion kWh; in other words, 16.2 percent of the electricity generated in Spain. And although this Catalanian production did not succeed in meeting the electrical demand in Catalonia, 20.041 billion kWh, in 1982 as we have said, it benefited from the interconnection provided by the peninsular electrical system, totally built by the companies in the sector. In 1982 Catalonia received from the peninsular interchange a contribution of 7.567 billion kWh, in comparison with the sending of 5.417 billion kWh from Catalonia to the national system in the same year.

This real deficit status of Catalonia prompted the Catalanian firms to continue the nuclear option undertaken with Vandellos I; also realizing that some sources of primary energy for electrical use were being depleted, such as the fossil types existing in our soil, from which Catalonia benefits greatly in the Andorra (Teruel) region. Others, such as the hydraulic resources, are necessarily limited; and, finally, still others, such as liquid fuels, are becoming expensive to almost prohibitive limits. Hence, the Catalanian business owners, as was also done at the proper time by those elsewhere in Spain, decided to provide themselves with a replacement energy, completely experimented on in the world, such as nuclear energy, which had native and world experience in the field of electric development. So Catalonia, with a general plan for the electrical sector and the best combined industrial sector in Spain, decided to continue, with intense dedication, the initially costly, but profitable over the long term, policy of nuclear powerplants. This gave rise to Asco I,

followed by Asco II and Vandellos II and, if the decision of those governing does not prevent it, Vandellos III.

But while Catalonia's status had a deficit in 1982, benefiting from the areas into which the Spanish electrical map is divided, this status will start changing this year, 1983, with the entry into service of the Asco I Nuclear Powerplant; because this nuclear plant will generate about 6 billion kWh per year. And it will change substantially in 1984, with the entry into service of Asco II, with the same features as Asco I. And, as an active reserve to deal with the increases in demand that are starting to appear in 1983, Catalonia will have Vandellos II, during the 1980's more or less.

The Increase in Demand

All this nuclear equipment will be necessary to maintain a certain amount of guaranteed service to meet the demand in Catalonia, without systematically resorting to aid from the peninsular electrical interchanges, except in cases of extreme necessity. It should be borne in mind that the indexes on growth in the electrical demand in Catalonia and Spain represented a doubling every 10 years during the 1960's; and it was essential to provide for this supply sufficiently in advance, because a thermal or hydroelectric powerplant needs from 4 to 5 years for construction, and from 8 to 9 years are required for a nuclear powerplant.

This is a point on which reflection would be in order. The increases in demand, which amounted to 11.8 percent per year during the 1960's, doubling every 7 years, and declining in the 1970's to 7.9 percent, doubling every 10 years, and continuing to drop to the limit of 1.65 in real growth during 1982, are again starting an obvious recovery in 1983, a change in direction, to the point where, from January to September, inclusive, the increase in Spain's electrical demand amounted to 4.53 percent. The reflection that we offer our readers is merely that of whether the electrical sector can "each year" correct the decision to build new powerplants just to meet the foreseeable electrical demand "each year." The answer is simply no.

The need for dealing at all times with the recovery of electrical consumption, as an accurate index of the country's economic progress, requires punctual compliance with the plans for construction of new facilities for electrical production, to guarantee in the future supplies of electrical equipment of suitable size to comply, at all times and instantaneously, with the upward fluctuations in demand for electric power. It should be realized what long periods of time are required for the construction of powerplants, and the reader will reply, with us, that it is impossible to correct each year the plans for new electrical equipment that have been initiated, without surely risking failure to supply the electrical market.

This argument is so correct that its irrefutable certainty may be proven by the real fact of the intense drought suffered by Spain for the past 3 years, which has continued this year; a drought which has alarmingly reduced the

possibilities of resorting to the hydroelectric facilities. Nevertheless, thanks to the misnamed "over-equipment," it has been possible to meet the demand thus far, without the catastrophic recourse to restrictions. We should add to this the need to continue reducing the weight carried by oil in the production of the liquid fuel powerplants; and one will understand the essential, urgent, need to have new facilities based on different types of fuel, particularly coal and uranium.

There is every indication that the indexes on the increment in electrical demand will increase in Spain by a predictable 5 percent in 1983, forced upwards not by an industrial rebirth which unfortunately will not take place in a year, but rather by notable increments in domestic consumption, that of services, public lighting, etc. In other words, the indexes are forced by a better quality of life that cannot be given up. This real fact prompts one to think that, if these increments are reinforced by an increase in energy demand from industry, as is both desirable and possible, and for which the Spanish people, from the government down, are striving, twofold thanks would have to be given to the electrical sector for not having been discouraged from building new facilities, but on the contrary, despite the indecision, weakness and uncertainty disseminated by the public authorities in recent years, doing so.

Nuclear and Hydroelectric

Returning to Catalonia's status in the national electrical system as a whole, there is no doubt either that the Catalonian electric companies have joined in a timely manner in the effort to maintain intensive activity of equipment, and not just with the nuclear option. The very fact that the president of UNESA is currently the president of Electric Power of Catalonia may sufficiently explain the active presence of the Catalonian electrical sector in the national electrical system as a whole. Of course, the significant fact of Juan Alegre Marcet's presence in the UNESA presidency signifies recognition of the enormous personal status of this electric sector.

Hence, Catalonia's position has been quite clear. With a production in 1979 which accounted for 17.38 percent of the national electrical production (16.2 percent in 1982), during that year of 1979 it was quite aware of the need for resorting to the nuclear option to eliminate its forced energy dependence on the other national areas. In that very year of 1979, the statement that we reprinted at the beginning of this report was made, uttered by Juan Alegre Marcet, who predicted that only the electric sector would be capable of making the partial substitution of oil with nuclear power. To be sure, Catalonia, with Vandellos I and Vandellos II started in 1977, and with Asco I and Asco II, proved in time that it could pursue the real policy of nuclear powerplants; although, as occurred in the rest of Spain, the lack of understanding curtailed the good will of members of the electrical sector committed to heavy investments in new essential nuclear powerplants, without anyone actually guaranteeing against the risk and losses withstood by "authentically national" firms.

However, this does not mean that the Catalonian firms have restricted their efforts for the nuclear option; because at present the work is continuing on

the construction of the Estanygento-Allende hydroelectric pumping powerplant, owned by Electric Power of Catalonia, with a power of 400 MW; the first group of the Moralets hydraulic powerplant, also a pumping facility, owned by the Ribagorzana National Hydroelectric Enterprise, with a power of 200 MW; and the 400 MW Airoto hydroelectric powerplant, owned by Hydroelectric of Catalonia; all of which attests to the concern and effort of this autonomous region not to miss any opportunity for achieving a strictly Catalanian electrical supply, insofar as possible; even though this effort is especially aimed at the nuclear field, wherein Catalanian technicians have also proven the development of Catalanian nuclear electric technology with the latest Asco I, Asco II and Vandellos II Nuclear Powerplants.

Nuclear Powerplants in Catalonia

Name	Power	Status	Owner
Vandellos I	500 MW	Generating in	HIFRENSA
Vandellos II	982 MW	advanced construction	0.08 FECSA 0.54 ENHER 0.28 HECSA 0.10 SEGRE
Asco I	930 MW	Generating in tests	FECSA
Asco II	930 MW		0.4 FECSA 0.4 ENHER 0.15 HECSA 0.05 SEGRE
With prior authorization			
Vandellos III	972 MW	Under construction	FECSA

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ELECTRIC POWER DIRECTOR SEES FUTURE FOR N-PLANTS AFTER 2010

Stockholm DAGENS NYHETER in Swedish 2 Jan 84 p 44

[Article: "Nuclear Power to Remain"]

[Text] "Our job is to make nuclear power as reliable as possible."

"If it is still working well in the year 2010, I cannot imagine that it simply will be discontinued."

This was stated by Jonas Norrby, general director of the State Power Board.

In 1984 the State Power Board will celebrate its 75th anniversary as a public utility.

This utility, which at first included only hydroelectric power, now comprises nuclear power, natural gas, peat, wind power, solar energy, and other energy sources as well.

But what will the State Power Board do in the future? And what will happen to nuclear power, which parliament decided to discontinue in the year 2010?

Jonas Norrby believes that nuclear power is better than energy from combustion processes, whether they involve coal, peat, or forest fuels. He points to environmental problems which he believes people will soon recognize and be influenced by.

"Nuclear power is superior in this respect," Jonas Norrby claimed. "Apart from that, it depends on how you evaluate the problems involved. There is the danger of accidents, of course, but this danger is much less serious than the environmental impact of combustion."

According to Jonas Norrby, the best alternative to nuclear power is to expand hydroelectric power as much as possible, i.e. by an additional 25 TWh (terawatt hours).

Today hydroelectric plants are capable of generating about 63.5 TWh. According to the plan of the hydroelectric power committee, this capacity will be increased by 2.5 TWh by 1990. This does not include the Kalix, Pite, Torne,

and Vindel Rivers, however.

The plan involves primarily the reconstruction of existing power plants and additions to them.

"The continued expansion of hydroelectric power generation must begin by the nineties," Jonas Norrby said. One reason for this is the personnel situation at the State Power Board. In 1983 alone, the number of employees involved in construction dropped by 250. An additional 1,400 jobs will disappear during the remainder of the eighties.

The State Power Board presently is responsible for about half the electricity generated in this country. From being a strictly electricity generating company, however, it has become more and more an energy company.

Along with several municipalities in Norrbotten, the State Power Board operates a solid-fuel company. It also has invested heavily in the development of heat pumps.

Does Sweden not run the risk, now that there is a surplus of electric power, of exchanging its oil-dependence for an equally serious electricity-dependence? Many maintain that electricity will become more expensive during the nineties and that changing energy sources will be expensive at that time. Electric heating also increases three times as rapidly as district heating.

There is no such danger, according to Jonas Norrby. He also claims it will be no more expensive to convert from electricity to other energy sources.

"Sweden's primary energy goal is to replace as much oil as possible. As a result, we must fully utilize our capacity to produce electricity. A conversion to electricity also will result in energy savings."

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